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Glossary

Chumadu	Carrying load on one's body
Ennal	Counting
Etukkal	Recovering retted husks from backwater
Kettu	Bundle, here, of fibre and yarn
Kolli/Maali	Husks bundled together and immersed in backwater for retting
Kottuvadi	Mallet of wood or iron used for beating retted husk and extracting fibre
Mootal	Sinking husks for prolonged period in backwater for retting
Pichu	Fibre cleaning
Piri	Spinning
Polairichil	Ripping the fibre off beaten husks
Ratt	Spinning equipment consisting of one fixed wheel and two moveable wheels
Runnage	Length of yarn per kilogram
Tallu	Beating husks to extract fibre
Unakku	Drying, here, sun-drying of yarn

Technological Change in Kerala Industry: Lessons from Coir Yarn Spinning

K. T. Rammohan*

1. Introduction

For long, mainstream development discourse on Kerala had attributed the State's industrial backwardness to high wage and labour militancy. While it is possible that other variables like efficiency of workers remaining the same, capital would prefer docile and cheap labour, the conclusion was rather impressionistic and had been reached without any concrete studies. The proposition that high wage is a fetter on Kerala's industrialisation was challenged by a mid-1980s study which showed that the wages in the organised industrial sector in Kerala were in fact lower than in several other industrially developed Indian States. The study posited the alternate hypothesis that it was the technologically backward structure of the Kerala industry, causing low labour productivity and minimal forward and backward linkages that retarded the industrial development of the region.[1]

Despite its element of tautology - backwardness of industry because of backwardness of industrial technology - this line of reasoning rightly emphasises technological backwardness as a crucial fact of Kerala's industrial life. Indeed the major industries in the State, whether it be coir processing, handloom weaving or beedi-making, are marked by the use of low productive technologies. Further development of industry in the State, among other factors, thus crucially hinges on technological upgradation. Yet, given the fact that the level of technology in use is shaped by a host of factors, not merely economic, the shift to a higher

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* *K. T. Rammohan is Fellow at Centre for Studies in Social Sciences (CSSSC), Calcutta.**This discussion paper is the first outcome of my enquiry into the ongoing technological change in coir yarn processing industry in Kerala. I am indebted to Dr K. Narayanan Nair and his colleagues at Kerala Research Programme on Local Level Development for active encouragement and financial support. The logistic support came from several friends. Fieldwork in Kerala crucially hinged on help from R. Sundaresan, University College, Thiruvananthapuram. M. Vijay Baskar, Centre for Development Studies helped to organise fieldwork in Tamil Nadu. S. Raju, School of Social Sciences, Kottayam took care of visual documentation. K. Ravi Raman, Kerala Agricultural University provided crucial statistical information. The study also owes much to several rounds of conversations I had with Kuttiyil Soman, Asokannan, Ashokan (Kuzhiyam), Vijayamma and Raghavan at Kollam, and P. Thyagarajan, Hariraj, and Tamilselvan and Selvamuthu at Pollachi. K. K. Subrahmanian, K. Ramachandran Nair and G. N. Rao (CDS) commented on the original proposal for the study. Conversations with K. P. Kannan and T. M. Thomas Isaac on aspects of industry and labour in Kerala were also helpful. Theoretical aspects of commodity chain, a major element in the analytical grid of this discussion paper, were initially discussed with Vijay Baskar, Harilal, Ravi Raman, and Raju. Barbara Harriss-White and Ruwani Jayawardane offered perceptive comments on the first draft of this paper. Nandini Gooptu, S. Anandhi, Rajorshi Dasgupta, Hiranya Mukhopadhya, and Rene Veron enriched it with further observations when it was presented at the Seminar on Contemporary South Asia held at Queen Elizabeth House International Development Centre, University of Oxford on 5 March 1998. Amiya Kumar Bagchi, Saugato Mukherjee, and Nirmala Banerjee, my colleagues at CSSSC, Calcutta and Abdul Salam, Kannur, and K Muralidharan, Kochi offered comments on the final version of this paper. When this paper was just about to be finalised Kaliprasad Gosh brought to my attention a new material, the existence of which I was not aware, and S. Ray (CSSSC Library) kindly procured it for me. To all of them I am immensely grateful. A special word of thanks is due to K. Nagaraj, Madras Institute of Development Studies, whose incisive yet encouraging comments as the referee have helped the paper to attain its present form, however imperfect it might still be.*

technological frontier presents itself as a complicated move. The new techniques may be ideal from the point of view of productivity but are inappropriate to the social economy where these are applied.[2] Moreover, it is important to consider the environmental implications of the new technology.

This paper relates to the question of technological change in Kerala industry by foregrounding the case of coir yarn spinning industry. Coir yarn is spun from the fibrous husk of coconut, a major produce of the region. Coconut husk is first defibred and the fibre thus obtained is spun into yarn. Coir yarn finds use on its own as also for weaving into mats and mattings. The present study primarily draws upon fieldwork carried out in three adjoining villages that are important centres of coir yarn production in southern Kerala.

Why coir? In terms of employment, coir industry is the most important among Kerala's technologically backward, low productive industries.[3] Workers in coir yarn processing are drawn from among the most disempowered social groups, mostly women of 'lower' and 'out' castes and to a much lesser extent men of 'out' castes.[4] Despite intense trade unionisation the wages in the industry are lower than even in agriculture. Statutory minimum wages are not paid even in the cooperative segment of the industry. Further, days of employment in the industry has shrunk to less than six months a year. The ongoing technological change in the industry thus has implications for vast sections of disempowered people in the State. Further, the success or failure of technological change in this 'sunset industry' has considerable significance from a growth perspective of the industry and the economy.[5] Furthermore, given the fact that technological change currently underway comes after a gap of nearly a century- and-a-half, it holds a mirror to the issues of long-run technological change in Kerala industry. At the very least, it may be expected to offer lessons regarding technological change in similar low productive industries like handloom weaving and cashew nut processing that operate in a similar social environment.

2. An Historical Overview of the Industry

> *Of all the gifts which Providence has bestowed on the Oriental world, the coco-nut tree most deserves our notice: in this single production of nature, what blessings are conveyed to man! … The trunk though, porous, furnishes beams and rafters for our habitations; and the leaves when platted together make an excellent thatch, and common umbrellas, coarse mats for the floor, and brooms; while their finest fibres are woven into very beautiful mats for the rich… The nuts contain a sweet and delicious milk, and a kernel, sweet as the almond: this, when dried, affords abundance of oil; and when that is expressed, the remains feed cattle and poultry and makes a good manure. The shell of the nut furnishes cups, ladles, and other domestic utensils; while the husk which encloses it is of the utmost importance: it is manufactured into ropes, and cordage of every kind, from the smallest twine to the largest cable, which are far more durable than that of hemp.*

[James Forbes, *Oriental Memoirs*][6]

It would be difficult to date exactly the beginnings of coir yarn and rope production on the Kerala coast, but clearly, the activity received a major boost during the 16th century. This

was coupled with the rise in world demand for cordage for shipping following the rise of European maritime powers. Portuguese traders played an important role in the trade of cordage from the Kerala coast. The second phase of expansion in coir production occurred in the 19th century with the entry of British trading capital. The new world-demand was for coir matting. In Europe, coir mattings were being used by the rich as underlay for carpets and by the poor as a substitute for carpets. The world-metropolitan trading houses that operated from the Kerala coast exported coir yarn to England and Ireland where it was woven into mattings. A part of the yarn exported to London was re-exported; it reached the matting factories in The Netherlands and Belgium.[7] Since the mid-19th century, coir-matting factories emerged in Kerala's port towns as well. Throughout the colonial period production, trade of coir products was under the dominance of world-metropolitan capital.[8]

As the world demand for coir mattings boomed, the number of weaving factories multiplied. Accordingly, the demand for coir yarn, the raw material, significantly expanded prompting changes in technology and scale of production. Hand spinning gave way to spinning by wheel, and innumerable households in the backwater-side villages became sites of coir yarn production. The concentration of coconut production on the coast, the existence of backwaters that helps the soaking of husks and the preparation of fibre, the integrated network of backwaters and canals that facilitates economic transportation of bulk material like coconut husk, fibre and yarn, and the possibility of obtaining cheap labour - all these contributed to such localisation. The yarn produced by the households was carried in country boats along the rivers and backwaters to the port towns, and woven into mats and mattings in the factories operated by metropolitan capitalists. A part of the yarn produced was also exported as such, again through the metropolitan export firms based in port towns. Western Indian merchants acted as 'factors' in the dealings between local traders and metropolitan firms. The coir products were procured for exports through a long arm of credit extending from the metropolis to the peripheral village through traders of various sorts and scales. As integration through credit and commodities was reinforced, most of the backwater-side villages became helplessly dependent on coir production for survival. Indeed the dependence became literally proverbial: *Chavara, Panmana, Thevalakkara kayaru kondu pizhakkanam* (Chavara, Panmana and Thevalakkara [villages] are condemned to survive by coir).

3. Objectives of the Study

This study aims to address the implications of the ongoing technological change in coir yarn spinning industry in Kerala. In particular, it addresses the following questions: What is the context, nature, and scale of technological modernisation? Which are the agencies and what are the processes of technological diffusion? What is the potential of technological modernisation from a growth perspective of the industry? What could be its possible income distribution effects in relation to labour? What are the likely social implications, in particular in terms of the socio-economic standing of caste and gender groups involved in the industry? These questions coalesce into an enquiry into the complex world of technological initiatives and processes, relations among machines and women and factors mediating these, the matrix of costs and prices, and aspects of generation and distribution of surplus.

4. Problems of Conceptualisation

Technological change means different things to different groups of economists. Here, we shall merely touch upon two broad approaches, the neo-classical and the Marxist. To neo-classical economists, technological change is primarily a question of 'choice of techniques'. The choice is seen as determined by the relative price of labour and investment. Classical Marxist theorists view technological change as a variation in the organic composition of capital, a rise in the share of 'dead' labour as against living labour, the enhancement of relative surplus value. Consequently, its implications for the course of the capitalist system are probed.

These are indeed abstractions of technological change. The ground reality that we address does not present itself as the rational, self-seeking entrepreneur's insistent search for the most efficient technique. Nor does it mark the march of capital systematically redefining its mode of accumulation. This discussion paper revolves around the cooperative segment of the industry, that too an ailing cooperative segment. The present investment in new technology marks not an aggressive act of ploughing back of surplus and concentration of capital but an act of grace issuing from the State in the form of loans and subsidies.

The questions that we address in this study are primarily empirical. The central question is that of technological change but the issues at stake are not confined to the workplace. Aspects of both production and trade have to be considered. Further, there are important non-economic nature variables to be considered: The implications of the prevailing and proposed technologies for the working conditions and the state of natural environment, the grid of power relations within which technological change occurs and its diffusion takes place and so on.

An all-encompassing theoretical framework that captures the multifarious dimensions of technological change under discussion is hard to come by. The commodity chain analysis, drawn from the Braudel Center theorists, which we deploy in this paper, is thus only a proxy.[9] This is privileged over competing methods primarily because it helps to integrate the aspects of both production and trade. It also facilitates examining the implications of technological change on production relations. Some of the issues regarding technological change may, however, be addressed only through other means. For instance, the financial viability of the ongoing technological change in the fieldwork region calls for working out the cost schedules under different techniques of production. Further, the viability hinges crucially on the conditions in the neighbouring centres that produce similar products. This in turn demands cost-comparisons across the State border. Occasionally, we engage in the anthropologist's method of 'thick description'. We have thus a mixed bag of tools and a hybrid approach, conjecturally justified.

The available studies relating to traditional industries in Kerala are often rich in detail and in many cases analytically significant and theoretically inspired as well. Specifically on coir, the substantive studies are anchored from within the classical Marxist analysis of development of capitalism. The specificity of the local trajectory of development is recognised, even emphasised, but primarily in terms of differences from the 'classical' mode. Commodity chains network, a major element forming the analytical grid of this discussion paper, promises

to be conceptually more liberating. Commodity chains are constitutive of European capitalism but these are neither specifically European nor capitalist. Thus the concept may help to recover the subjectivity of the local economic processes better. The hybrid approach pursued in this study may be hoped to further facilitate this. Yet, we have been able to engage in the new methodological exercise only in a preliminary fashion. Much more work needs to be done to knit and improve upon the synthesising approach proposed here.

5. Commodity Chain Examined

A commodity chain represents the network of labour and material processes that precede a finished commodity. These linkages of raw materials, labour, processing technologies, and product market materially connect economies, regions, and peoples across the world. Each production operation in a commodity chain is called a node. In relation to each node, we may examine the nature and implications of such aspects as material flows (basic goods and industrial goods), mode of transfer (market and other forms), relations of production (wage labour and other forms), production organisation (household, cooperative, private capitalist, and state), and technology (type and extent of mechanisation). The specific location of a class/social group/zone in a commodity chain influences its share in the total value generated. The relative share of value accruing to different economic agents might be redefined by reconstituting the commodity chain .

The framework of commodity chain analysis, as pointed out earlier, is a contribution of the Braudel Center theorists. Their focus of interest is the global commodity chains. The nature and direction of commodity and surplus flows along the global commodity chains are viewed to reflect the division and integration of labour processes, and to reveal the production dynamics of the capitalist world-economy. The concept thus holds a clue to the larger theoretical concern of world-economy theorists, ie unequal development on a world-scale. Certain regions monopolise the more profit-generating segments of the global commodity chain and corner a larger share of the surplus to the detriment of other regions located differently.

This paper proposes that the concept of commodity chain may be employed within a more restricted economic-geographical space as well. The concept may thus be used to examine the matrix of production and trade linkages of specific commodities in village-economies, and consequently, to reflect on the means of redefining the prevailing dynamics so that greater value is produced and/or its greater part is retained within the local economy and/or with specific economic agents. This objective could be realised through one or more of the following means: Addition of new nodes or elimination of certain existing nodes, technological reorganisation of nodes, recasting of ownership forms and production relations, and elimination of certain agents in the commodity chain.[10]

6. Fieldwork

The observations made in this paper are based primarily on fieldwork, conducted in three phases. The first phase that lasted for about 10 months - from December 1996 to September

1997 - was conducted primarily in the three Kerala villages that form the focus of the present study. In between, in July 1997, three weeks were spent in Pollachi, in Tamil Nadu, which is a major source of fibre for yarn spinning in the fieldwork villages. Data on financial aspects of technological change were collected first during the second phase of fieldwork conducted from April to September 1998. The financial data were updated during the third and final phases of fieldwork, in February 1999.

Interviews and discussions formed the major mode of data collection. The interviews were anchored on a pre-determined set of questions but we did not opt for structured questionnaires. All interviews were recorded. Besides, field diaries were maintained meticulously. Sometimes, instead of one-to-one interviews, discussions were held with groups of workers and their views on the ongoing technological change. These discussions were also recorded and transcribed at regular intervals. Data on costs of production were collected from private entrepreneurs and cooperatives by filling out cost schedules.

As the ongoing technological change is confined to the cooperative sector, a major share of our data were drawn from it. We selected all the five cooperatives that had opted for the new technology and one cooperative that had chosen not to go in for it. Despite a membership of 100 to 150 workers, a cooperative will have only half or even less number of actual workers. One cooperative that we had selected had a membership of 700 workers. However, the number of actual workers in this cooperative was just about 100.[11]

We held interviews/discussions with:

(i) twenty workers, president, and secretary of each selected cooperative;
(ii) private manufacturers and traders of coir products in the field work villages, 16 in all;
(iii) manufacturers of coir fibre, rope, and mattresses in Pollachi, six in all; and
(iv) four officials of the Directorate of Coir Development, Government of Kerala and the Government of India-controlled Coir Board, the two agencies that spearhead the ongoing technological change.

7. Coir Yarn Commodity Chain: Production and Labour

Coir yarn is marked by a twin identity: It could be an intermediate product or a final product. As an intermediate product, yarn is used for weaving into mats and mattings, which are major items of export. Coir matting has a variety of uses. Its traditional use has been as underlay for carpets. Currently, coir matting is increasingly used as geo-textiles to prevent soil erosion and as acoustic material. As a final product, coir yarn finds direct use in cultivation (fencing of cornfields and scaffolds for vines), fishing (ropes), and house construction, particularly by the poor.

Coir yarn is a highly differentiated product. Yarn, spun in different localities, varies in terms of twist, runnage (length per kg), and end-use. Yarn with greater runnage means finer yarn. Such yarn is an intermediate product - it is woven into mats and mattings and mostly exported.

The smaller runnage yarn is a final product. The demand for this product is primarily from within the country. Prices of different varieties vary. Each variety of yarn is known after its locality; thus *Anjuthengu* yarn, *Mangadan* yarn, and *Vykom* yarn etc.

Given the existence of umpteen studies on work and work processes in the coir industry, we will not dwell upon these at length. Instead, here we intend to view the labour process in the industry through the analytical prism of commodity chain analysis.

The coir yarn commodity chain comprises two major nodes: First, production of fibre, and then, production of yarn therefrom. Production of fibre involves two important operations: Retting and defibring. Retting refers to treatment of raw husks (green husks) to loosen fibre from the husk-shell and to ease its extraction. This is carried out in the backwater. Flushing washes away the tannin and thus facilitates bacterial action that decomposes the fibre-binding pectin. Salinity lends strength to the fibre. For retting, a pole is driven into the bed of the backwater and husks are arranged one on top of the other in a circle. It is then covered with mud, palm-leaves, and coir net. Weights, usually huge stones, are placed on the top to allow the husk-bundle to sink. The bundle remains in the brackish water for several months helping bacterial action. Each bundle, known as *kolli* or *maali*, has a diameter of 10 metres and contains 10,000 husks. It requires four workers, working together for four hours, to make a *maali*. While male workers make the *maali,* women carry raw husk to the backwater-side and the retted husk is carried back to the site of defibring.

Defibring denotes the preparation of fibre from retted husk. Retted husk is beaten with a mallet (*kottuvadi*) to separate fibre from pith. Women squatted on the backwater-side do this work.

Spinning involves the conversion of fibre into yarn. Spinning is carried out on wooden spinning wheels (*ratt*), that are operated by hand. A woman worker rotates the fixed wheel while two other women walk backwards feeding fibre, each of them drawing out a strand of yarn and later twisting these into one by pushing forward the moveable wheel.

A *maali* of 10,000 husks when retted and defibred yield 900-950 kg of fibre and when spun yield 800-850 kg of yarn. The output varies depending on retting time and the consequent absorption of salinity, and technique of production, for instance, mechanical defibring yields less quantity of fibre and therefore lesser yarn.

Fibre production node involves both men and women. Mostly men of 'out' castes (*Pulayas*) assisted by women of 'lower' (mostly *Ezhavas*) and 'out' caste are engaged in retting. Exclusively women, mostly of 'lower' castes (almost all *Ezhavas*), undertake defibring. Yarn production node engages exclusively women. They are also mostly from 'lower' castes (*Ezhavas*).

Table 7.1 summarises the major characteristics of the industry in terms of the nodes and processes of yarn production, and gender and caste composition of workers.

Table 7.1 Coir Yarn Production and Labour: Major Characteristics

Node	**Node 1**		**Node II**
Operation	Operation I Retting	Operation II Defibring	Spinning
Process of conversion	Raw husk > Retted husk	Retted husk > Coir fibre	Coir fibre > Coir yarn
Gender composition of workers	Both men and women	Only women	Only women
Caste composition of workers	'Out' castes and 'lower' castes	'Lower' castes	'Lower' castes

Source: Fieldwork, June 1997

The largest share of workers is employed in the spinning node. For every five workers employed in the defibring node (one for retting and four for defibring), 18 are employed in the spinning node.[12]

Several 'sub-operations' tie themselves to the major operations of each node. These include such operations as *ennal*, *pola irichil*, *pichu*, *unakkikettal,* and *chumadu*. *Ennal* refers to the counting of husks, both before and after retting. *Pola irichil* denotes ripping the fibre off the retted husk. *Pichu* refers to cleaning the fibre before spinning. A simple motor-driven machine is used for this purpose. *Unakku* refers to sun-drying the spun yarn. *Kettal* is bundling. *Chumadu* is to carry by head-load the fibre and yarn to and from different sites of operations. These are ancillary operations but as we shall see subsequently, many of these are necessary even after the introduction of the new technology.

The physical conditions of work in the industry are strenuous. The *maali* for retting is made by workers standing waist-deep in the backwater. Retted husk has to be carried by head-load to the defibring site. Defibring demands working in uncomfortable squatting position in the swampy backwater side. The spinning worker is condemned to walk several miles a day, forward and backwards, between the two spinning wheels that make a *ratt* set. As all these operations are performed outdoor, the workers often have to bear the burden of rain and sun too. Such conditions of work cause high incidence of certain diseases among coir workers, particularly among women workers. Common health problems encountered include allergic problems of skin and respiratory system, body ache, chest pain, rheumatism, gynaecological complaints, headache, stomachache, and vomiting. A sample study showed that in the cooperative segment 68 per cent of the workers complained of allergy and respiratory infections, 49 per cent of chest pain, 39 per cent of rheumatic problems, and 52 per cent of body ache.[13]

Work gets inscribed on the body of the coir worker:

> *A coir worker can be easily identified by her appearance: Her clothes, body and hair as soaked with the stinking black juice of retted husk that splashes around during beating,*

her hands callous from wielding the kottuvadi (mallet) and from the hard fibre rubbing along the fingers and if she is a lifetime spinner, her feet curved outwards as a result of the endless walking towards the back on spinning.[14]

The industry comes to halt if the rain is excessive and goes on for days as is the case during monsoon. From bare survival otherwise, the workers are pushed to starvation during the monsoon.

8. Profile of the Fieldwork Villages

The fieldwork villages, ie Perinadu, Thrikkadavoor, and Thrikkaruva, lie on the north-east of Kollam district in southern Kerala. The villages adjoin each other and are skirted by the Ashtamudi Backwater. Together, these densely populated villages comprise an area of 85.16 sq. km. The total population is 1,09,379 persons ie 1,898 persons reside per sq. km. The total number of households in the fieldwork villages is 22,663. As with the rest of Kerala, the sex ratio favours the female. Female population constitutes 50.73 per cent of the total population and male population forms 49.27 per cent. Again, in tune with the rest of the State, the village population is highly literate. The overall literacy rate is 91.27 per cent: Male 95.18 per cent and female 87.55 per cent.

The fieldwork villages mainly grow paddy and coconut. The paddy fields are not expansive as in the 'rice bowl' areas - like Kuttanadu and Palakkad - in the State. The holdings are rather small. Likewise, coconuts are not grown in large plantations. There are plots that grow only coconut, but the bulk of the production comes from the homesteads - a small plot of land surrounding the house - where it is grown along with other garden crops like jack-fruit and mango. Coir yarn spinning and fishing are the other important economic activities in the fieldwork villages. Further, like many other Kerala villages, the fieldwork villages are well-connected to towns and there has been a spillover of town population, in particular the middle-class, to these villages. This and the inward financial remittances of villagers working in Middle-East Asia have triggered off a boom in the construction sector. A precise measure of inward remittances to the fieldwork villages is not available but going by the district average, the remittances would form about one-fifth of the net domestic product.[15]

Work participation rate in the fieldwork villages is 34.91 per cent: Male 45.79 per cent and female 24.35 per cent. Whereas the overall work participation rate is significantly higher for male, women predominate both household and non-household industries. In household industries, 58.8 per cent of the workers are women; in non-household industries, their share is 66.70 per cent. This is largely explained by the predominance of the almost all-women, coir yarn spinning industry in the fieldwork villages.[16]

9. Coir Yarn Spinning in the Fieldwork Villages

Coir yarn spinning is the major industrial activity in the fieldwork villages. Its presence is very visible physically. The air is filled with the smell of retted husks, dumps of coir waste (pith) stand out like tiny hills in the homesteads and common land, the entire backwater-side

is dotted with various kinds of coir production sites, men standing waist-deep in backwater making *maali* or punting *kettuvallam* that carry husk, fibre, and yarn, women squatting and beating the retted husk with *kottuvadi*, spinners rotating the *ratt* or walking backward and forward feeding fibre and drawing yarn. An elderly woman worker aptly put it: "One way or the other we are all related to coir". Indeed, the relation starts almost from birth. As an elderly, woman coir worker told me:

> *Pandokke athungalkku ravile ithiri kanjivellamo randu kappayo enthenkilumokke koduthu oru moolakku allengil rattu vandiyude chuvattilu konduvannu iruthum. Kidakkukayanel payittu avide kidathum. Ithiri valarnnal avalu nalla chakiri nulli perukkum. Pathu vayassayal athu krithyamayi rattu karakkunna thozhilali aavum. Pinne pirikkanum thodangum.*

(During earlier days, we would give the baby some *kanji* or a couple of pieces of cassava or whatever in the morning and seat her in a corner of the worksite or near the spinning wheel. Alternatively, spread a mat and make her lie there. As she grows up a little, she would start 'pecking' good fibre from bad. By the age of 10, she would be a full-fledged wheel rotator. And later, begin to spin as well.)

The social-cultural embeddedness of the industry is also difficult to miss. It comes as no surprise that work is suspended even in the Marxist-controlled cooperatives during the *Typooya* festival at the local Velayudhamangalam Murukan Temple. During our fieldwork, work was suspended for a longer stretch of days than during the festival due to the unfavourable business conditions.

The coir yarn produced in the fieldwork villages is of *Mangadan* variety. It has a shorter runnage than *Anjuthengu* variety - 140 to 150 metres per kg compared with 200 metres or even more for *Anjuthengu* yarn. *Mangadan* yarn is not used for weaving. It is used as an end-product, primarily in agriculture. The yarn from the fieldwork villages is initially consigned to trading centres in the neighbouring Tamil Nadu and Andhra Pradesh. The final market extends even to Punjab and Haryana in northern India.

During earlier days, a person with sufficient backwater-site to ret husk and an interest in trading/manufacturing would engage casual workers to make *maali* and to defibre husk. He may also advance retted husk to households and receive in return fibre or spun yarn. Such producer-worker households mostly worked with family labour. The system was later modified with the households selling fibre/yarn in the open market and paying the price of husk to the putting-out entrepreneur. Some of the putting-out entrepreneurs were primarily manufacturers, some traders of coir products, and still others small/middle peasants on the lookout for additional income. In the course of time, a few big entrepreneurs, who directly organised retting, defibring, and spinning with a host of wageworkers working in his premises emerged. Small traders, trader-manufacturers, and manufacturers were linked to big traders and manufacturers through traders of varied scales and thus a long entangled chain of credit and commodities formed.

Putting out system is on the wane now. Big traders of husk and manufacturers of yarn have also disappeared practically from the fieldwork villages. Their decline is explained to a large extent by the decline in fortunes of the local capital owing to shortage of husk and consequent

high prices, erosion of the cheap labour base of the industry, and increasing competition from new products as well as new centres of production. Many big traders simply withdrew from the industry and chose to depend on agricultural income or support from educated, employed children. The State-owned apex marketing federation (Coirfed), which is the biggest dealer of coir fibre and yarn now, fills the role of the big trading capitalists of earlier days. Now, all cooperatives sell yarn to Coirfed, which also supplies fibre to the cooperatives. With the industry hitting bad times, many big yarn manufacturers have quit. They have been replaced by several production cooperatives, which could withstand the vagaries of the market better as these were backed by the State.

Even after the near-extinction of the whole stratum of big private entrepreneurs, the industry in the fieldwork villages is marked by a varied spectrum of producers. This owes to the specificity of the industry that allows production to be organised on varied scales. Consider the retting operation. A *maali* needs 10,000 raw husks. This costs about Rs 5,000-6,000. Rent of backwater space for six months is Rs 100. Coir net to cover the husk costs Rs 100. The wage for *mootal* and *etukkal* is Rs 600 each. The total cost is Rs 6,400-7,400 to make a *maali*. This is not to suggest that a family could sustain itself by making a couple of *maali*. A coconut-growing\trading household might, however, view it as a source of additional income and take up the activity. The scale of *maali*-making would widely vary from entrepreneur to entrepreneur depending on the financial resources, availability of husk from own grove, and extent of backwater space. The scale of the defibring node varies similarly according to the working capital capability of the producer. The main elements of this cost are raw material and wage. Consider the spinning node. A traditional spinning wheel set costs only around Rs 2,000. The village carpenters make it using minimal wood and some steel rods. Its running costs are very low. Indeed, all that it needs is some coconut oil to reduce friction at the pivot and an overhaul once a year. A person with about Rs 5,000 and some land could set up two sets of *ratt*, get fibre on credit from traders, employ mostly family labour and sparingly neighbourhood labour, and carry on subsistence-production. Alternatively, a person with much larger resources could set up a large number of *ratts* and employ a larger number of workers, buy fibre in bulk when its prices are low and hold back the yarn produced, for better prices. An established entrepreneur would have a fair size of homestead or other land adjoining backwater, big country canoes (*kettu vallam*) to move husks, fibre and yarn, and large financial resources as working capital. At each node, different scales of activity are thus possible. Further, there is the possibility of undertaking more than one nodal activity. Many entrepreneurs combine retting and defibring, a few including some cooperatives undertake spinning as well.

This suggests that primarily the scale of operations will be determined by the scale of working capital at the command of the entrepreneur. Of course, it is the low level of technology employed that reduces the need for investment in fixed capital and expands the relative share of expenditure on working capital. Further, the low level of technology implies slow production processes. Consequently, the velocity of funds is low and there is need for large fund to keep production going. Retting a *maali*, for instance, involves an expenditure only of about Rs 6,400-7,400. The retting time, however, is 6-8 months, which would mean that the money is recovered only then or a month or so later depending on the time of selling.

Majority of the yarn producers in the fieldwork villages is of the household organisation kind. Many of them have only one *ratt*. Each such household unit employs three workers, including the family members. During times of rise in demand, the 'one-*ratt*' producers lease in additional *ratt* and increase production to the extent allowed by their scale of working capital and the homestead land. The small producers rarely have the resources, financial or land (and thus backwater space), to undertake retting. They buy retted husk on credit from traders and settle credit when the yarn is sold. Often they seek credit from traders to pay the weekly wages too. The prices charged by the trader for husk include interest and profit. Earlier, most of the small producers operated within a putting-out system, receiving retted husk from traders and returning spun yarn to them. The practice of obtaining fibre on credit, mostly imported from Pollachi instead of retted husk, is on the rise. The medium-scale producers own 5-10 *ratt* and circulate a working capital of around Rs 5-10 lakh each. Each of them employs 15-30 workers. As we shall see shortly, along with private entrepreneurs, most cooperatives also belong to this category. The big producer owns more than 10 *ratt*, invests at least Rs 10 lakh, and employs more than 30 workers. While there were a few such producers in the fieldwork villages earlier, now there is only one person who could be termed a big producer. He owns 25-50 *ratt* and circulates a working capital of more than Rs 25 lakh.

A coir worker may be thus self-employed, working in her own household unit, working for her neighbour or for other private entrepreneurs as a wageworker, or working in a cooperative as a member-worker. Many workers have a hybrid identity; they may work for private entrepreneurs as also for cooperatives depending on the availability of work. The workday is for 8 hours, usually from 7 in the morning till 3 in the evening. However, as time-wages are based on piece output there is a certain extent of flexibility in work timings. Four male workers together make a *maali* of 10,000 husks in four hours and receive Rs 60 per 1,000 husks. Wages for recovering the *maali* after retting (*etukkal*) are identical. A defibring worker defibres 100 husks (400 *pola*) a day for which she is paid Rs 46. A team of three women workers spins 30-36 kg of *Mangadan* yarn in a day. Wages are paid by length of yarn, Rs 5.50 per 150 metres. These wage rates relate to the cooperative sector. In the private sector, the rates are lesser by a few rupees in each case. The cooperative workers are also entitled to a bonus @ 20 per cent on wages. Wages are paid at the end of every week, on Saturday.

Given the fact that the coir workers are employed in disparate physical sites and varied ownership sectors one might expect that they would be like Marx's peasants, nominally united but actually disunited 'sack of potatoes'. To the contrary, their trade union organisation is remarkable. The worker's strike in March 1997 demanding higher wages, which we witnessed during our fieldwork, is an important pointer in this regard. The token strike of March 5 was followed up with an indefinite strike beginning from March 17. The strike was total with all workers in the fieldwork villages, irrespective of whether they worked for private manufacturers or cooperatives, participating in it. In cooperative sector, a settlement was reached on April 15. In private sector, the strike continued up to the first week of May. The strike paid a rich dividend in the form of a wage hike by Rs 10 for all categories of workers.

Yet, it should not be assumed that workers have a fair deal. Even after the wage hike induced

by the strike, the wage of the highest paid worker does not count up to the statutory minimum wage of Rs 73.70 per day. Cooperatives are no exception to this. Entrepreneurs argue that given the poor state of the industry, the stipulated minimum wages are more than what the capital can bear. Further, the union has not succeeded in ensuring full employment. Employment, even in the cooperative sector, is just around 150 days in a year. This also is attributed to the present bad times of the industry.

As evident from the institution of statutory minimum wages, the State has not been altogether neglecting the plight of the coir worker. Nevertheless, its efforts are far from adequate. The pension/welfare fund scheme for coir workers is another pointer in this regard. The scheme is contributory in nature and covers the workers of both private and cooperative sectors. A private manufacturer pays every year Rs 3,000 or 5 per cent of the turnover whichever is higher to the fund. Further, he pays in an annual contribution of Rs 25 for each *ratt* installed. A cooperative has to contribute Rs 50 annually for each motorised *ratt*. The worker's contribution in both cases is Rs 60 per year. However, as in the case of statutory minimum wages the scheme falls much short of the requirements of the workers. When the workers retire at the age of 60 they are entitled to a monthly pension of Rs 100 which is far from supportive in an economy like Kerala where the cost of living is high. The welfare component of the scheme undertakes to pay Rs 2,000 in case of marriage and Rs 500 in case of death in the worker's family. It is indeed surprising that the scheme does not provide for any assistance to meet medical expenses despite the fact that working in the industry causes severe health hazards. Nor does the scheme provide for the education of children though most of the children in these families attend school. Workers are forced to borrow, often even from private moneylenders, to meet the expenses of books and clothing at the beginning of the school year.

The caste and gender composition of coir workers in the fieldwork villages largely conforms to the overall pattern in the industry Statewide.[17] Workers are drawn mostly from 'lower' castes and 'out' castes and women predominate. The gender and caste-based division of labour in the industry has thus continued unchanged through centuries. Yet, important changes have taken place in the age-profile of workers. Till even a couple of decades back mostly young women were employed in spinning and children were entrusted with the task of rotating the wheel. Young women are no longer attracted by this work and form only a very small share of the spinning workers now. They seek employment in town and many of them work as sales women in shops. Within the village itself several garment making units, supplying to garment shops in town, have recently come up that offer a new source of employment. These jobs often pay less than coir yarn spinning, but they offer steady employment. The construction sector that offers relatively high wages and steady employment also engages several young women. Another noticeable change is in the employment of children in the industry. With the spread of schooling, children too are hardly employed in the industry. At present, mostly very elderly women rotate the wheel. Elderly women, mostly in the 40+ age group also do defibring. Workers in the industry are thus the most disempowered social groups - economically, socially, and even age-wise.

While coir yarn spinning continues to be the major industrial activity, its importance in the village economy has been shrinking over time. Education has been a source of upward

mobility for at least a few members among the coir worker households. Further, with the changing structure of the village and surrounding economy even the less educated members of families engaged in coir-related activities have moved away from coir into other kinds of manual work like construction. Many are now employed in the service sector.

10. The Cooperative Grid of Power

Cooperatives rarely match the idealised notion of "association of free and equal producers". On the contrary, it is not unusual that the founding principles of cooperation are subverted. As Sharat Bhowmik puts it:

> *Though a co-operative is formed on the principles of equality and joint ownership it can often be found that a small minority may have effective control of the organisation. In such cases, even if this minority is benevolent enough to look after the interests of all members, the majority is excluded from the decision-making process and thus the basic purpose of the co-operatives are defeated.*[18]

Given this possibility of subversion, it is important to ask how the relations work out and decisions taken in the fieldwork cooperatives. Do the fieldwork cooperatives also display rule by minority? If so which is this minority? What is the source of its power? How does it control the decision-making process? These questions have important implications for the mode of introduction of technology and its diffusion.

An overview of the historical development of the fieldwork cooperatives would be in order here. Initially, the coir cooperatives were established to deal in retted husk and thus to liberate the small producers from the control of retted husk dealers. The cooperatives advanced retted husk to small producers. The producer sold yarn in the open market and settled his/her dues with the cooperative. The cooperative stepped in to buy the yarn from the producers when the market was bearish and the producer could not get a remunerative price. Initially, thus the cooperatives performed the function of putting-out industrialists.

Since the 1970s, the cooperatives began to undertake yarn production directly engaging member-workers. They organised both the defibring and spinning nodes in their premises. Their activities, however, soon ran into a rough weather with the increasing shortage and spiralling prices of raw husk. The State intervened to ensure supply by introducing legislation curbing long-distance movement of husk. Further, the apex marketing federation was entrusted with the task of supplying fibre to the cooperatives. The shortage of husk and high price, however, continued. Simultaneously, there was a rise in the import of fibre from Pollachi. This fibre, mechanically produced, though not of good quality, was cheaper than local fibre. Consequently, the local producers of yarn ceased producing fibre locally/buying local fibre, and shifted to Pollachi fibre. Most of the cooperatives cut down defibring activity significantly and many ultimately abandoned it. Now, even the apex marketing federation supplies imported fibre to the cooperatives.

As an economic entity, in terms of their scale of operations, cooperatives are comparable to

middle-level producers. Most of the cooperatives operate 5 to10 *ratt*. Although many cooperatives are making loss consistently and would find it difficult to survive if State support is withdrawn, they have accumulated assets in the form of land and backwater-site. A cooperative may have 100-150 members or even more though only half of them may be actually working in the cooperative. A Board of Directors administers the cooperative. The day to day working and accounts keeping of the cooperative and liaisoning with State cooperative department officials are entrusted to a secretary. He is also entrusted with overall supervision of work. The secretary is at least a matriculate with training in cooperation. Some cooperatives employ a manager, mostly a senior male worker, to supervise work and to check the quality of yarn produced.

If cooperatives are "born in the lap of capitalist production" they may indeed share many features of capitalism itself. Yet, there are many aspects truly commendable about the fieldwork cooperatives. They do not negate wage labour but have succeeded in ensuring a relatively better share of the value to the worker as wages and bonus. They may not be the ideal cooperatives characterised by "associated labour plying its toil with a willing hand, a ready mind and a joyous heart"; but clearly the worker relates herself to the cooperative and to her work differently from how she relates to in a private establishment. In a cooperative, the hierarchy is less severe and the worker has a better stature. The fact that cooperatives are 'run' by political parties to which the workers owe their sympathy also helps to generate a feeling of 'togetherness' at the workplace.

Nevertheless, the cooperatives are also sites of power relations. This, the power relations in a cooperative, is a much-nuanced domain. A possible entry-point to understanding this is certainly class. The relational milieu is, however, defined by other equally or more important aspects like caste and gender also. Therefore, often it becomes difficult to talk of worker as a monolithic entity. The vast majority of the workers in the fieldwork cooperatives are women of the Ezhava community. They are practically landless in the sense that even if they have a plot of land it is so small that it can accommodate just two or three coconut trees besides their dwelling.[19] In most cases, their parents were also involved in the industry or were agricultural labourers. Having attended a few years of primary classes they are not illiterate though through disuse their situation, in particular that of elderly workers, is very close to that.

The president and secretary of the cooperative, though mostly drawn from the same community as the workers, form a different lot from the workers. Unlike the workers, they are educated and often hail from erstwhile rural gentry or middle-class. The superior class position is particularly true of the president. It is noteworthy that despite the fact that coir is primarily women's industry the management is almost all-male. Besides president and secretary, the worker-directors of the Board also are mostly male.

The President and Secretary, select profiles:

President A, 50+, hails from an Ezhava landlord family. He is a graduate. Besides being associated with the coir cooperative, he is on the Board of the local cooperative credit bank. He is a member of the district committee of the Communist Party of India (Marxist)-led

[hereafter, referred to as Party] trade union.

President B, 20+, a law graduate, belongs to an Ezhava middle class family. He is the secretary of the local committee of the Party.

Secretary A, 40+, is an Ezhava, with a working class background. Finished matriculation and cooperative training. He is a cardholder of the Party.

Secretary B, 30+, is an Ezhava lower middle class origin. Finished matriculation plus and cooperative training. He is an activist of the trade union of cooperative employees and of the Party.

In sum, the scene is thus: The secretary, usually male, the only white-collar worker, formally educated and with specialised training, a relatively more powerful person in the Party, and a vast body of poor, semi-literate, women workers. As the overall supervisor of labour process, the secretary embodies the 'authority of capital'.[20] It would be difficult, however, to characterise the relationship between him and the workers as antagonistic. There are many binding ties. First, capital is not analogous to private capital. It is the collective capital of workers. The 'authority of capital' he represents is therefore different from the authority of private capital. Further, the secretary and workers are mostly drawn from the same community (caste), may even share similar class background, are often from the same neighbourhood, and mostly subscribe to the same political faith. The economic stakes of both are dependent on the well being of the cooperative. Given this context, the workers tend to view the secretary as a coordinator. His efficiency is appreciated and lack of it condemned. Unless in those cases where he is involved in financial irregularities which tend to wreck the cooperative and jeopardise the lives of workers his relationship with the workers tend to be cordial.[21] This is not to suggest that the workers see the secretary as exactly one among the own flock. Nor is he seen as the 'other'. His position is that of a mediator between the Board and the workers. (One of the fieldwork cooperatives has a woman-secretary. Interestingly, here the secretary's stature is purely that of a clerk, a white-collar worker sans the authority of capital. The powerful figure, capital personified, in this cooperative is the president, a male.)

Another aspect of the fieldwork cooperatives is that the decision-making minority exists primarily outside the cooperative. Often, and perhaps naturally so, it is the locally powerful political party that organises the cooperative. Theoretically the membership to the cooperative is open but the party may see to it that the majority, if not all, of the members are sympathisers of the party. The party fields its official panel of candidates for election to the Board of Directors. Usually, the Board would thus comprise only the card-holding members of the party. The Board appoints the Secretary who is, again, a 'party man'. A party fraction, exclusively or predominantly male, thus comes to control the decision-making domain of the cooperative.[22]

It could be argued that the ruling minority in a cooperative is one approved by a larger political milieu including the workers of the cooperative. Yet, the very rise of a controlling minority and its external origin goes against the spirit of cooperative democracy. In a subsequent section, we shall examine the implications of this for the ongoing technological change.

11. The Course of Technological Change

Traditionally, coconut fibre was spun into yarn by rolling between the palms. Later, in the mid 19th century, following the expansion in the world-demand for mats and mattings, demand for yarn rose significantly, which in turn demanded higher productivity in the yarn spinning sector. This led to the replacement of hand spinning with wheel spinning. Technological organisation of the preceding node, namely, defibring (including retting and defibring operations), however, continued unchanged. The biochemical process involved in retting was not fully understood then. This ruled out the possibility of undertaking innovations to reduce the retting time.[23] The introduction of defibring machine was attempted, but met with disappointing results. Mechanical power required to defibre coconut husks was high. The costs compared unfavourably with the wages for defibring by hand. Given the peripheral status of the economy, labour was cheap. The employment of those from marginalised social groups, 'lower' and 'out' castes, in particular women and children cheapened it further. Moreover, the defibring mill tended to damage the fibre. Thus, except the shift from hand to wheel, technological organisation of coir yarn spinning industry remained unaltered to the end of the colonial period. (At the port-town exporters' end, however, an important cost-saving technological change occurred - the use of hydraulic presses for baling. This helped to cut down freight by half).[24]

A defibring machine for retted husk was introduced in Kerala in the 1950s. The precise conditions under which this occurred are not clear. The new machine, which was later called the Kerala drum, resembled in some ways the Ceylon drum for extraction of bristle and mattress fibre, and the paddy thresher used in Kuttanadu. The machine consisted of a spiked metallic cylinder and two metallic rollers, all connected by a gear system and driven by electric motor. May be the social conditions did not exactly require the new technology or because it had several drawbacks, the Kerala drum had received indifferent spread.[25]

There were renewed attempts to introduce defibring technology in the late 1960s\1970s. This was a period when the demand for the product was high. The defibring mill that was introduced was not an advanced type. It employed decorticating method. Alternatively called beater, the decorticator (literally, peeler or scraper) consisted of a revolving drum with beater rods and was driven by an electric motor. It could process only retted husks. The retted husks were given a gentle beating and the *pola* ripped off the hard shell. The *pola* was then fed into the beater that separated fibre from pith. The beaters were introduced at a time when the demand for the product was high. This was a period which witnessed an employment crisis in the industry due to shortage of husks. The workers feared that the spread of new technology would confound the crisis of employment. Naturally, the attempt to introduce new technology met with stiff resistance, including of the Luddite kind, from the workers. The State, therefore, intervened and prohibited the use of beaters except in the northern districts where labour was not in excess.

All through the 1970s, the shortage of husks continued causing a hike in its price. Recourse to the raw material shortage was found by importing fibre from Pollachi in the neighbouring Tamil Nadu, which had over time emerged as a centre of coconut cultivation and coir fibre

production through mechanical means. The husks available within the State continued to be defibred by hand, employment was thus retained, and the shortage was met through imported fibre. With Pollachi fibre being imported the case for continued ban on beaters, as a means of protecting employment in defibring became weak. Beaters came up in the southern districts too and the number of beaters increased over time. In early 1997, there were 392 mills handling retted husk, employing 3,023 workers. The highest number of mills, 142, were located in our fieldwork district. These mills are small establishments. These are located by the backwaterside to facilitate easy unloading of husk and loading of fibre. A small shed houses the machine. The small piece of land around is used for counting the husk before for defibring, to sundry the fibre, and to dump the pith. Together, this would require an investment of about Rs 3-4 lakh, their economic status roughly equivalent to medium-scale yarn producers. The mill-owners operate the mill as a service-industry, undertaking defibring of retted husk for yarn producers.

The 1990s present a changed scenario. The lack of steady employment in the industry, the higher level of education attained by young women, the changed attitude to work, and the possibility of alternate employment, in particular, in the booming construction and service sectors have all contributed to a reduced preference for work in the coir industry. Enough labour is not forthcoming in particular to the defibring node. Further, the imported fibre from Tamil Nadu that at one point of time helped to supplement the local shortage of husks and retain employment in the spinning segment now manifests itself as a threat to local defibring activity. Pollachi is also emerging, albeit slowly, as a centre of yarn production as well.

In this changed context, trade union resistance to mechanisation has quietened down. Moreover, a steady stream of expert studies conducted in recent years by state agencies has sought to emphasise technological reorganisation as the only means of revitalisation of the industry in Kerala. The ongoing State scheme of technological modernisation has been generated in this context. The scheme aims at increasing productivity, wages and value-addition, assuring steady employment, and reducing backwater pollution due to retting. It envisages technological reorganisation of both the important nodes in the coir yarn commodity chain.

First, instead of backwater retting of husk, mechanical extraction of fibre from green husk followed by its treatment with bio-inoculants for improving the quality of fibre is proposed. This would be carried out in ground level storage tanks filled with bioinoculants-enriched freshwater. This is expected to significantly reduce retting time and to avoid pollution of backwaters.

Second, defibring mills would eliminate defibring by hand (beating) in a phased manner. The defibring mill is operated by electricity. It consists of two units. The first is a pair of cast-iron rollers revolving on a horizontal axis. The rollers crush the husk to yield the fibre. The second unit is a combing machine that separates pith and cleans the fibre. The introduction of the defibring mill would help to eliminate hard labour done in uncomfortable posture. It would also serve to increase productivity.

Third, electric motor-powered spinning machines would replace the traditional spinning wheels operated by hand. This is expected to increase productivity and to turn out more value-added products. The yarn yielded by the machines would be the finer variety yarn that could be used for weaving. The demand for yarn as an end product has been largely stagnant. However, the demand for intermediate product yarn has been increasing as derived from the increased demand for mattings. This would imply that the proposed modernisation would have the advantage of integrating yarn production with the 'sun-rise' segment of the industry. The new spinning machines allow workers to sit and spin, eliminating thus the walking between the wheels characteristic of the prevailing technology.

Fourth, modernisation scheme envisages the conversion of defibring waste, pith, into a commercial product, the 'pith plus' fertiliser. Finally, as all production operations would be shifted from open air to in-door work can be done even in adverse weather conditions.

In sum, the proposed technological plan when fully unfolded would change the technological organisation of the two nodes, defibring and spinning , and add a new mode (the production of pithplus using pith). The change may be represented as in Table 11.1.

Table 11.1 Technological Reorganisation in Coir Yarn Industry

Node	**Node I** **Production of fibre**	**Node II** **Production of yarn**	**New node created** **Production of pithplus**
Traditional technology	Backwater retting of green husk and extraction of fibre by hand	Spinning by hand on ratt	Pith is not subjected to value-addition
New technology	Mechanical extraction of fibre from unretted green husk and bio-inoculant treatment of fibre	Spinning on wheels driven by electric motor	Production of pithplus from pith

The ongoing scheme of modernisation is confined to the cooperative sector. The project comprises two major schemes. First, the establishment of 200 modern spinning units, each with 100 electrical motor-powered spinning machines, in the existing cooperatives. Second, the establishment of 100 electrically-powered defibring mills under the aegis of cooperatives to be floated newly. The investment required for modernisation is sourced from the Integrated Coir Development Project (ICDP) jointly organised by National Cooperative Development Corporation, Union Government, and State Government, contributing 50, 20, and 25 per cent of the outlay. The balance 5 per cent of the outlay is met by the cooperative. Installation of 100 motorised spinning machines requires an investment of Rs 18 lakh. Each cooperative identified for modernisation would be provided the required fund, half as loan and the balance as subsidy. Establishment of a defibring mill requires an investment of Rs 20 lakh; this is provided on similar terms as for mechanised spinning.

Besides this, there are two State government schemes. The first offers financial assistance to the spinning cooperatives for creating the infrastructure - purchase of land, construction of storage tanks etc - to undertake rapid retting and conversion of pith into 'pith plus'. The second scheme, on the anvil, aims to provide assistance to the cooperatives for the purchase of diesel-fuelled electric power generators to operate the machines during power shortage.[26]

To date, assistance has been offered to set up 125 mechanised spinning units and 58 defibring mills in the State. Of these, production has been commenced in 63 spinning units and 12 defibring mills.[27] The cooperatives in fieldwork villages are now in various stages of introduction of new spinning technology - in one of them, new spinning machines were installed as early as in October 1995. One new defibring mill has also been proposed for the fieldwork villages. During our last round of fieldwork, in February 1998, the process of purchase of machinery for this unit had just begun.

What has been the mode of introduction of technology? Clearly, the ongoing technological change is initiated from the top. The 'top' includes bureaucrats, at the State and Central levels, and scientists. It includes the Party and trade union headquarters as well. The State directive comes with the offer of necessary financial assistance to install the new machines. The local cooperative officials invest only half-belief in the new technology. Yet, plagued by shortage of finance they are all too keen to receive the loans and subsidies that accompany the new technology. As technological modernisation has now the full blessing of the Party, it is the second source of pressure. The Party fraction in the cooperative faithfully carries out the Party directive. As we could gather from our fieldwork, the issue of technological modernisation was not discussed in any cooperative in a larger forum than the Board of Directors. Not that the workers were not aware of the move but they were never given a formal chance to seek clarification or give their opinion. As a result, the ongoing technological change is for them a happening outside themselves, almost like some new machines suddenly being dropped into their workplace. The political-administrative structure that excludes workers from decision-making also overlaps with the larger political-social structure that denies agency to women and 'lower' castes. They are conceived as inert objects of development planning or political action. The exclusion may not be premeditated but its manifestation is elitist and patriarchal. Such mode of introduction of technology is bound to have implications on the manner and pace of technological diffusion as well.

12. Technological Change in Retting Operation

The localisation of coir yarn spinning in the fieldwork villages was influenced, among other factors, by the existence of backwater that provided the facility for retting. Backwater retting, however, is ridden with adverse ecological consequences. The foul smell that has become a permanent fixture in the village air is caused by backwater retting. Backwater retting has also been a major cause of depletion of fish stock in the backwater prompting the fisherfolk to protest.[28] The ongoing technological change in retting addresses the ecological question. The proposed strategy is to substitute backwater retting with bio-inoculant treatment of mechanically extracted green husk fibre. The new retting technique is expected to quicken the production process. This would accelerate the turnover of working capital and therefore save on its cost.

Fieldwork cooperatives are now in the course of introducing the new retting technique. The cooperatives are sinking wells and installing electric pump-sets to draw fresh water. Simultaneously, ground-level storage tanks are being built to conduct retting. There is also a proposal to install refrigerators to safe-keep bio-inoculants.

There are some grey areas regarding the technological reorganisation of retting operation. While the scheme is projected as capable of eliminating the adverse ecological consequences of retting altogether, it would be worthwhile to remember that the new technique, at least for now, is confined to the cooperative segment. Cooperatives, backed as they are by State subsidy, may discard backwater retting. It is, however, bound to continue in the private sector at least for some more time. Not an insignificant share of yarn production is carried out in the private sector.[29] It is indeed doubtful if private producers, especially the smaller producers, would be willing or capable of undertaking the required investment in sinking wells, building storage tanks, and purchasing pump-sets and refrigerators. Again, even within the cooperatives, no scheme has been drawn up for treatment/disposal of water from the retting tanks. A related question is, given the high investment, whether bio-inoculant retting is cost-effective.

Another fundamental issue is that the backwater is being polluted and fish-resources being depleted due to retting. While this could be true it needs to be explored whether the ecological implications are being exaggerated for a certain truth-effect. It is interesting that a certain construction of the ecological consequences of retting emerges after the coir-producing villages are 'invaded' by the middle-class for residential purposes. The point is whether the projected ecological consequence is a class statement or not.

Another intriguing aspect of the new technology suggested is that it is water-intensive and makes new demands on the dwindling ground water resources. Moreover, it is energy-intensive with ecological linkages drawn far and wide. Thus, from an ecological perspective itself, how good is the new technology?

13. Technological Change in Defibring Operation

Technological reorganisation of the defibring operation in the fieldwork villages is still on the anvil. A relatively more successful cooperative, the officials of which also have close relationship with the ruling party, has been given the green signal to establish a defibring mill. Besides ICDP loan and subsidy, the cooperative has also been promised additional assistance by the panchayat. The cooperative is now making enquiries with mill manufacturers in Coimbatore and Pollachi.

As new defibring technology has not yet unfolded drawing definitive conclusions would be unwarranted. Operating within this major limitation, it is nevertheless important to reflect on the promises and to speculate on the problems of the proposed technological change. Technological change in defibring holds out two promises. First, mechanical defibring is expected to eliminate the literally backbreaking work of woman labourers in unhygienic conditions. Second, it would reduce working capital costs and render production cheaper by quickening the process of production.

The first promise is certain to be fulfilled at least partially. With the setting up of new defibring mills under the aegis of new cooperatives, a substantial part of the raw husk now retted and defibred by hand in the fieldwork villages would be processed mechanically. The second promise, of rendering production of fibre cheaper, needs detailed consideration and may be answered by precise cost calculation of both manual and mechanical defibring. As the new technology of defibring has not yet been operationalised in the fieldwork villages, we could not calculate directly and precisely the cost of producing fibre using new technology and compare it with the cost of manual defibring. By proxy, we take the cost of mechanical defibring in prototype beaters (decorticators) that already exist in the private sector. The comparative costs are presented Table 13.1.

Table 13.1 Technological Change in Defibring Operation: A Comparison of Costs

Elements of cost	**Cost of defibring by hand (Rs)**	**Costs of mechanical defibring (Rs)**
Raw material: Raw husks, 1,200 nos. @ Rs 550 per 1,000 husks	660.00	660.00
Wages: *Mootal kooli* @ Rs 60	72.00	72.00
per 1,000 husks *Etukkal kooli* @ Rs 60	72.00	72.00
per 1,000 husks *Tallu kooli* @ Rs 46 per 100 husks/ wages @ Rs 200 for machine- processing 1,000husks	552.00	240.00
Production overheads @ Rs 130 per 1,000 husks	NIL	156.00
Bonus @ 20 per cent on wages	139.20	76.80
Cost of producing one quintal of fibre	1495.20	1276.80

Source: Fieldwork, February 1999

Qualifications: (a) Defibring mills have not yet been set up in the field work cooperatives. The figure given above relates to a decorticator in the private sector. (b) Depreciation on machine, interest on loan and miscellaneous wages not included.

The cost advantage of mechanical defibring is obvious from Table 13.1. It may be noted that the cost of producing one quintal of fibre by hand is Rs 1,495.20. The defibring machine brings down the cost to Rs 1,276.80 per quintal. It would, however, be difficult to overlook one important aspect. In the case of defibring by hand, Rs 696.00 accrue as wages (Rs

835.20 including bonus) to the local economy when one quintal of fibre is produced. Resorting to mechanical defibring brings this down to Rs 384.00 (Rs 460.80 including bonus). Indeed, from the technology upgradation perspective, it could be argued that the wages of the beating workers form 'socially unnecessary wages' deriving from socially unnecessary labour. It could also be argued that while the wage share per quintal of fibre produced declines it might be possible to increase the aggregate employment and wage income in the local economy through increased turnover. Such a possibility, as we shall see shortly, is seriously constrained by shortage of the raw material, coconut husk.

The lower processing cost for mechanical defibring as noted above, by itself does not guarantee that the new defibring technology would be successful. This is due to the coir yarn commodity chain transgressing to neighbouring regions. As pointed out earlier, a significant share of the fibre requirements of the fieldwork villages is currently being met from Pollachi. This fibre costs only Rs 1,120 per quintal, which is clearly much lower than the cost of producing fibre locally, even by mechanical means. If we include the interest on capital investment in new technology, the cost of producing fibre locally is bound to rise further. The question is what makes production of fibre cheaper in Pollachi. In section 14, we shall explore this in detail. For now, it may be pointed out that the cost advantage of Pollachi lies primarily in the availability of cheap husk.

It needs to be pointed out that depreciation and interest on capital have not been considered in calculating the costs. Indeed such exclusion goes against pure economic logic. If these costs\charges are also considered, the comparison might show a different picture.However, the specific entity that coir cooperatives are, fully supported by the state in undertaking technological change, the cooperatives maintain that depreciation does not have to be accounted for as the state would replace machines. Again, while the investment in new technology is financed through loan and subsidy the cooperatives do not anticipate that the loan component would ever have to be paid back to the state. Hence, it is argued that interest on capital may also be ignored. We have also followed this on the ground logic of the cooperatives and excluded the two charges from cost calculation.

A major problem associated with mechanical defibring is retrenchment of workers. Although defibring mills are proposed only in the cooperative sector, given their large capacity, these would gather husk far and wide, and in a situation of inadequate availability of husk cause retrenchment in the private sector as well. The official argument is that all workers displaced from the defibring node would be absorbed in the spinning node. It is not, however, clear as to who would shoulder the responsibility of re-employing the defibring workers in the private sector. Moreover, full re-employment seems unlikely even within the cooperative segment. First, as we noted already, the defibring node now employs elderly labour, mostly women in the 40+ age group. We concluded that many of them found it difficult if not impossible to adapt to spinning on machines which requires good eyesight and also dexterity of a different order. Given their age and lack of experience in any activity other than coir, alternate employment may not be forthcoming either. Second, requirements of human-power are much less in the mechanised mode of defibring. Defibring mills would use raw husk. As traditional

retting is done away with, the four male workers - working together for four hours to make and sink a *maali* of 10,000 husks - would not be required at all under mechanical defibring. Again, the labour requirements for defibring proper are much less under mechanical means. This would be clear by looking at the conditions in the less advanced type of decorticators (beaters) that are already working in the fieldwork villages. While manual defibring of 10,000 husks requires 100 person-days, 15 workers can complete the job in a day (ie 15 person-days) in defibring beaters. Thus, there is a shortfall by 85 person-days per 10,000 husks processed. In the proposed defibring mills, the fall in employment might be more pronounced. Finally, it would be unreasonable to expect that the scale of mechanical defibring (and/or mechanised spinning operations) in the fieldwork villages would expand to accommodate all workers retrenched from the defibring node.

There is an important social dimension to this retrenchment. This arises from the social location of the workers. First, as pointed out earlier, an overwhelming majority of the workers are of 'lower' castes and a few from 'out' castes. Further, defibring workers are all women. Retrenchment thus falls upon socially disempowered sections. Second, going by the experience of the already working decorticators, the new technology might cause not only an absolute fall in employment for women but also losing out employment to male workers. At present, 100 women workers are employed for a day to defibre 10,000 husks. A decorticator can defibre 10,000 husks by employing 15 workers for a day. Of the 15 workers, only 10 are women. This would mean that the number of women workers employed to defibre 10,000 husks falls from 100 to 10 when decorticators are employed. Simultaneously, additional employment for five male workers is created in defibring, hitherto a preserve of women workers. Third, the women will be sidelined as well. The machine operatives are invariably men. Women are entrusted with carrying husk to the mill and collecting and carrying fibre etc. These indicate the need for conscious gender planning in introducing the new defibring technology.

Another component of the technological reorganisation of the defibring node is the proposal to make pith, the defibring waste, a commercial product. Pith has been traditionally used as a sun-cover around the foot of the coconut tree. Its salinity is also considered as beneficial for the growth of the tree. The sheer bulk of pith and high transportation costs have, however, acted against its popularity among farmers. Farmers have found it more economical and convenient to whitewash the tree for sun-cover and to apply common salt for saline need. As a result, a large share of the pith turned out lies unused. These pith dumps occupy substantial space on the backwater shore in the fieldwork villages. The new defibring mills tend to cause greater wastage than manual defibring. Two tonnes of pith are produced for every tonne of fibre produced in the defibring mill. Economical and efficient disposal of pith is therefore assuming increasing importance. The present proposal is to convert pith into an enriched fertiliser called 'pith plus'. It remains to be seen whether 'pith plus' can make inroad into market for chemical fertilisers which are much less bulky and enjoy long established demand. It is equally doubtful if it could compete with traditional organic fertilisers like ash, cow-dung and 'compost'. The 'pith plus' idea is a contribution of coir research scientists. The cooperatives have accepted it unquestioningly as part of the new package of 'financed' technology. It is thus a sad commentary on the scientists whose work is removed from the

farm and the factory, and on the nature of technological diffusion. (Pollachi, as we shall see shortly, appears to offer a more sensible clue to the use of pith. At Pollachi, pith is baled into bricks of a compact size for export. This implies easy carriage and significant reduction in transportation cost. The pith brick when immersed in water swells up and regains the original volume. It finds wide use in in-door horticulture in Europe.)

14. The Constitution of Prices

We have considered the total costs and cost break-up under different conditions of technology to understand the financial viability of technological change in defibring. Now, we may proceed to examine how these costs, ie prices of inputs are determined. To begin with, we shall look at the surface phenomenon of demand and supply of the two major commodities involved (raw material and labour-power), and then seek to understand the factors influencing these. First, consider the case of coconut husk, which yields fibre for spinning. "The availability of coconut husks at an economic price" has been traditionally viewed as a major factor determining the profit-level of the industry, the extent of employment, and the scope for further expansion of the industry. With coconut cultivation spreading to other south Indian States and local spinners increasingly turning to fibre imported from Pollachi, the availability of husks within is, however, becoming somewhat less critical though it still has an influence on local prices.

The husk question has several interesting dimensions. While cultivation of coconuts is widespread, only about 40 per cent of the husks produced in the State are delivered to the coir industry. A large share is consumed as fuel, not only by the poor, rural households, but by small and medium-sized restaurants as well - both rural and urban. The husk also finds miscellaneous uses in and around the household. As coconut is grown in innumerable small homesteads, collection is never comprehensive. Moreover, collection is organised through a long chain of traders, small and big, tending to increase the husk price. Further, the spinning industry is concentrated in southern Kerala and there, despite greater utilisation of husk for industry (as much as 60 to 75 per cent) there is absolute deficit of husk. The market 'limit' on output price does not allow drawing in surplus husk from northern Kerala or Tamil Nadu incurring high freight on the bulky material.

The supply scene as described above has been modified in recent years. The privileging of cash crops has worked utmost in favour of rubber cultivation and also for coconut cultivation. A major share of the paddy fields is being converted for growing coconuts. Some of the newly-planted area use rapidly and larger number yielding hybrid varieties, and supported by irrigation, produces coconuts of bigger size. Area under coconut cultivation increased from 8,63,000 hectares to 10,20,000 hectares between 1991-92 and 1997-98. Production increased from 4,641 million nuts to 5,911 million nuts. Productivity rose from 5,377 nuts to 5,793 nuts per hectare during this period.[30] Such increase has been attained despite an increasingly greater share of trees crossing their prime, the peak-bearing age, and the incidence of root wilt disease.

Not only that coconut production has increased but also production of coir fibre and yarn has

not shown any spectacular increase. Over 20 years, coir fibre production in India (of which a major share is of Kerala) increased by a mere 14,600 tonnes, from 1,50,000 tonnes in 1961-62 to 1,64,000 tonnes in 1984-85. Production of coir yarn in fact decreased during this period - from 1,40,000 tonnes to 1,03,740 tonnes.[31] Yet, neither the increase in coconut production nor the slow growth or even possible retardation of the spinning industry do not seem to have translated into increased supply of husk for the industry. An important reason seems to be the rise in price of fuel-wood. This has caused its substitution with husk, reducing the supply of husk for the industry and also raising the husk price. Scarcity of supply and "the problem of obtaining husk at an economic price" still plague the husk market.[32]

Labour-power, the other major commodity involved in constituting the yarn price tells a similar complicated story. The coir spinning industry was built upon the easily obtained supply of 'lower' and 'out' caste women and child labour. The caste and gender bases of the industry have not significantly altered even now but child labour has been substantially reduced with the spread of schooling. Young women shun work in the industry. It is not just work done by 'low' castes but a work that assigns the worker a lower status. For those castes who have been traditionally working in coir leaving it is also a way of breaking free from the work-social status association. Alternative employment opportunities have emerged in the construction and service sectors. In these new jobs, the physical conditions of work are substantially better, wages are often higher, and employment is fuller.[33] The increasingly higher level of education among young women has also meant increased preference for 'office-work' or 'office-work kind of' jobs, even if it is a low paid sales assistant in textile shop in town, or a poorly paid worker in garment-making unit in the village itself. As other sectors thus attract a part of the potential labour for the industry, the supply of labour to coir spinning has been shrinking, steadily though slowly.

Of course, the tendency of shrinking supply of labour is more recent and in the absence of any spectacular expansion of the industry yet to express itself in the form of higher wages. Wages in the industry have, however, risen due to other reasons. In the weaving segment of the industry, collective bargaining succeeded in wresting certain economic gain for workers even during the colonial times. The workers in the spinning segment were, however, unorganised and received starvation wage rather than living wage even in the '50s.[34] With repeated workers' struggles and a sympathetic government policy, the situation changed subsequently and the actual wage paid exceeded the recommended minimum wage by more than 100 per cent by early '70s. Since then, the rising cost of living in the State due to increasing import-dependence even for basic food thereby increasing the cost of reproducing labour-power has prompted rise in money-wages. The diminution in labour supply and expanding money supply with remittances from Kerala workers in Middle-East Asia ('Gulf') also had an important bearing on the general wage level during the post-1970 period. Yet, in what is clearly in contradiction with the general scene and also a retrogression from the position in early '70s, even the wages in the cooperatives are lower than statutory minimum wages. Coir workers' wage seems to hover around the wage of female labour in agriculture.

The result is a deadlock. Husk prices cannot be brought down. Wages can not (rather, should

not) be reduced. The output price may be increased only at the peril of losing market. The question that emerges is how centres of the industry elsewhere cope with this situation. Or, is it that the conditions that obtain there are entirely different?

15. View of Pollachi

Pollachi has experienced an explosion of coconut cultivation over the past decade-and-a-half. Besides the fact it receives a fair share of monsoon rains, Pollachi has considerable irrigation through tube-wells. Pressure of population on land is lesser than in Kerala and land ceiling laws are more 'liberal'. As a result, the distribution of land is skewed with a relatively larger share of big holdings than in Kerala. The visible result: Extensive coconut tracts often owned by a single person. This is unlike Kerala where coconut trees are now mostly inter-cropped, and interspersed with dwellings.

Pollachi had a tradition of coconut cultivation, production of fibre, and spinning of yarn but this was confined to isolated villages and undertaken on an extremely small scale. The region's more recent rise into a major producer of coir products owes to the explosion in coconut cultivation and the specifically capitalist mode of its cultivation. Coconut cultivation in Pollachi compares with plantation agriculture. Investment is sourced not necessarily from within agriculture. Many of the grove owners are mercantile capitalists and some, manufacturers. The specific mode of agricultural organisation has yielded significant reduction in transaction costs to the industry. Each coir factory can draw raw husk from within a smaller area and no long chain of intermediaries in trading exists. Many coir manufacturers themselves own coconut plantations, and factories are often set up in the midst of the plantation itself. The manufacturer's supplementary needs of husk could also be met from within a narrow area. Often, the manufacturer operates a truck and collects husk directly from the groves. Collection is comprehensive, transportation costs are minimal, and volume of trade margins are small. As a result, husk is relatively much cheaper in Pollachi. Further, as Pollachi palms are mostly hybrids, and well-watered and well-manured, the nuts are bigger in size and yield more fibre per husk. (In Kerala, the holdings are small and scattered, and husk reach the coir manufacturer after travelling through a long chain of intermediary traders thereby shooting up its price. As coconut husk is used as a fuel in the Kerala homes, collection is much less comprehensive. It is estimated that only about 30 per cent of the husk produced in the State reach coir work-sites.[35] Further, Kerala coconuts being mostly of the traditional variety, are small and yield less fibre.)

Another important facilitating variable for the growth of coir production in Pollachi has been its larger mercantile/industrial milieu forming as it does a triangle with two other major industrial centres, ie Coimbatore and Tiruppur. Pollachi had been a major trading centre of agricultural commodities. With a cotton-growing hinterland, it subsequently became a location for textile industry as well. This and the proximity to Coimbatore, a major centre of machine-goods industry, have led to the establishment of several light engineering industries in Pollachi. Pollachi is already an important centre for coir machinery manufacture as well.

Along with cheap raw material, husk, quicker production process has also served to reduce the costs in Pollachi. Manual defibring is almost non-existent. Instead, there are about 300 factories engaged in the production of coconut fibre in Pollachi. Of these, at least 225 factories employ advanced defibring technology. The rest use the less advanced type of beaters (decorticators) but these are increasingly replaced by advanced technology. Unlike in Kerala where husks are retted for several months in the backwater, Pollachi units resort to rapid retting. This, however, does not involve the use of bio-inoculants as envisaged in Kerala's new technology package. Raw husks are soaked in fresh water for three days and mechanically processed to yield white fibre. Alternatively these are soaked for 7 to 10 days and then processed mechanically to yield brown fibre.

A third important factor that tends to reduce the costs in Pollachi is the economies of scale. Many fibre factories are part of larger integrated production complexes. These are engaged in the production of a range of products and employ a mix of techniques. Consider, for instance, XY's factory: The factory is situated on the Pollachi-Udumalaipet highway, six km away from the industrial estate. It is in the midst of a coconut plantation that is owned by XY himself. Other than his own farm, XY draws raw husk from within a range of 20 sq. km. XY buys whole coconut rather than husk. These are mostly collected directly, occasionally through an agent, and brought to the factory premises in XY's own truck. Here, the coconuts are dehusked by male, manual labour. The coconuts pass through a series of machines where these are broken into pieces, and kernel desiccated into powder. Desiccated coconut powder is widely used in food industry. The husks pass through a crusher where a spiked drum pierces these facilitating easy entry of water into the husks. The crusher ejects the pierced husks, which are transmitted by conveyor belts into long concrete tanks filled with water drawn from tube-wells. The husks stay there for 10 days and are considerably softened. These husks are passed by conveyor belt into a three-piece unit consisting of a combing machine, turbo and beater to yield fibre. The fibre is sun-dried. Pith collected from the fibre mill is baled into compact blocks and marketed for horticultural needs. The fibre factory employs merely 10 workers, including four male operatives. A part of the fibre produced is sold as such and the rest is fed into the rope works and with the aid of electrically operated machines spiralled into ropes. These rope-springs or curled coir are combined with rubber to make foam mattresses. The rope-works employ only women workers. XY's rope-works, mattress works, and desiccated coconut powder works operate as a single unit in the industrial estate just about 6 km away from his fibre factory.[36]

The economies of the Pollachi manufacturer in procuring raw material and processing are obvious. The wide range of products helps to cross-subsidise the products if necessary. Yet, it is not merely the low-cost of raw material or the economies of scale that serves to reduce the costs of production in Pollachi. The organisation of labour in Pollachi industry is very different from Kerala. First, the use of advanced technology itself intensifies work. The machine, so to say, is the most rigorous supervisor of all. It dictates the speed of work, gets more work out of limited working hours. The new technology is combined with the age-old capitalist way of lengthening the working day without increasing wages. While the eight-hour workday is strictly followed in Kerala, in Pollachi factories the workday comprises nine hours, from 8.30 in the morning to 5.30 in the evening. We could see that actually the workday extended even more, up to 6 pm and even beyond, because the wrap-up at the end of the day is excluded from the definition of work. Further, rest time was almost nil and time allowed for meal negligible. Despite such intensification of work and lengthening of the

workday, the wage in Pollachi is just about two-third of that in Kerala (This may not,however, be confused with the workers' annual income which may be higher in Pollachi because there is full employment).

The labour scene, as described above, relates to the integrated production complexes such as XY's. The fibre and spinning factories located on the outskirts of the town demand still more dense labour from the workers. Let us have a look at PQ's spinning factory. The factory is located at Aalampalayam, off Pollachi-Udumalaipet road. PQ set up his factory in the early '90s. It employs about 125 workers. Work is conducted in two shifts. The first, of 10 hours' duration, is from 8 in the morning to 6 in the evening. This shift employs almsot only women. The second is a 12-hour shift for men, from 8 in the evening to 8 in the next morning. The wage paid in PQ's factory is lower than in the integrated production complexes as owned by XY. Rather than employing local labour who might demand relatively high wage, PQ employs migrant labour. These workers are drawn from the drought-prone, dry plains of Tirunelveli and Ramanathapuram. They are recruited through *kanganies* and financed through a system of advances as in the days of colonial, mining-plantation capitalism. We were told that there has not been a single strike in Pollachi coir industry. The workers are not unionised - either in the integrated production units or in the smaller factories

There is a lot of euphoria in Kerala's coir industry, particularly among a section of the bureaucrats and cooperative officials, and in the media about replicating the 'Pollachi model' of development of coir industry. The point that emerges from our fieldwork in Pollachi is that the so-called 'Pollachi model' is not merely a combination of machines. A combination that could be brought in pieces to Kerala and again combined to yield exactly similar results. Conversely, it is a collage of the specificities of organisation of agriculture, trade, technology, and labour. It tells *another* history of the development of coir industry. Indeed, Pollachi may offer certain clues regarding technological organisation of the industry. It cannot, however, be replicated. It may not be advisable to do so either.

16. Technological Change in Spinning Node

Technological reorganisation of the spinning node aims at manufacturing a new variety of yarn. The yarn currently produced in the fieldwork villages is of the *Mangadan* variety. This yarn, as noted earlier, is of shorter runnage than the *Anjuthengu* variety of yarn. Its use is primarily in agriculture. The rise of substitutes like plastic yarn has posed competition to *Mangadan* yarn in recent years. Even if there has been no absolute decline in demand for *Mangadan* yarn as a result, it has certainly constrained expansion of demand. The new spinning machines are designed to spin the longer runnage *Anjuthengu* yarn that could be used for weaving mats and mattings. Since mattings are being put to new uses such as guarding soil erosion, the weaving node has experienced a spurt in recent years. Technological change in spinning as proposed would thus have the effect of linking it to the 'sun rise' segment of the industry. Another merit of mechanised spinning would be the improvement of the physical conditions of work. "Endless walking" between the spinning wheels would no longer be necessary. Work may be done sitting on the seat attached to the spinning machine. Further, the workers would not have to work under the sun or in the rain; work would be performed in-door.

How do the costs of production compare under the old and new technologies? The costs of spinning on the motorised machine vis-à-vis the traditional wheel are presented in Table 16.1.

Table 16.1 Technological Change in Spinning: A Comparison of Costs

Elements of cost	Costs of spinning on traditional wheel (Rs.)	Costs of mechanised spinning (Rs.)
Raw material: Coir fibre	1356.00	1356.00
Wages: *Pichu kooli* *Piri kooli*:	40.00	40.00
Traditional: *Piri kooli* of 8 spinning workers @ Rs 46 per worker and *karakku kooli* of 4 wheel-rotators @ Rs 42 per rotator	536.00	NIL
Motorised : *Piri kooli* for 160 pieces of yarn @ Rs 5.50 per each piece of 150 metres	NIL	880.00
Unakku kooli: Traditional: For 8 bundles @ Rs 4 per bundle	32	NIL
Motorised: For 7 bundles @ Rs 7.20 per bundle	NIL	50.40
Bonus @ 20 per cent on wages (Total wages, manual, Rs 608.00; mechanised, Rs 970.40)	121.60	194.08
Production overheads: *Pichu* machine charges	40.00	40.00
Motorised: Oil, spares and technician's wages (estimate)	NIL	100.00
Electricity (estimate)	NIL	25.00
Cost of producing one quintal of yarn	2125.60	2685.48

Source: *Fieldwork*, February 1999
Qualifications: (a) Depreciation on machine and interest on loan not included. (b) The yarn produced on the machine is a different variety, with a higher runnage, and commands a better price in the market.

Spinning on wheels yields one quintal of yarn at Rs 2,125.60. When motorised machines are used, the cost rises to Rs 2,685.48 per quintal. The cost of production per quintal of yarn is thus higher in mechanised spinning. (If the cost of depreciation of machinery and the interest on loan by which the machines have been financed were taken into consideration, the cost would be still higher. Installation of spinning machines as per the modernisation scheme would involve an outlay of Rs 18 lakh. Purchase of a diesel-fuelled electric power generator

would entail another Rs 3 lakh. Only half the outlay, Rs 10.5 lakh, is provided as subsidy. Interest @ 18 per cent is payable on the balance Rs 10.5 lakh. This works out to Rs 15,750 per month. The field work cooperatives have not yet started paying interest. Whether the cooperatives would be able to shoulder the additional burden and how much it would inflate the per unit cost of production are questions that demand detailed investigation. An interesting aside is that cooperatives do not think that they would ever have to pay the interest. They expect the government to later write off this as subsidy). Along with this, there occurs a decline in the individual physical output (by weight) of workers. On the traditional spinning wheel three workers together turn out 30 to 36 kg of yarn by the end of the workday. The individual daily output is thus, around 10 to 12 kg. On the new machine a worker attains only a maximum output of 8 kg a day.

The increase in cost of production and the decrease in individual daily physical output (by weight) of workers, however, have only minimal significance when read against the fact that the yarn produced under mechanised spinning is a different variety. It is finer and has a higher runnage. It has almost similar runnage as *Anjuthengu* yarn (200-240-260 metres per kg of yarn) that is used for weaving and is thus a higher price-commanding product. While *Mangadan* coir fetches Rs 1,780-1,900 per quintal, the new *Anjuthengu* variety is priced at Rs 2,280-2,440. Price is fixed by runnage and not by weight (At present, however, the cost of producing either variety of yarn falls short of their market prices). There is no fall in the income of workers either as the earlier wages are maintained by re-fixing wages also in terms of running length. Further, the wages per quintal of fibre processed into yarn rises from Rs 608 to Rs 970.40 under the new technology. Thus, more money accrues to the local economy as wages when one quintal of fibre is processed.

Here we have considered costs step by step for each sub-operation and for the two nodes, defibring and spinning, considered in isolation. These may, however, be redefined in the course of aggregation. Different sub-operations knit into a node, several nodes fuse into a commodity chain. Even if the costs of a specific operation or at a specific node increase it may be offset by decrease in the cost of another operation or node, making the final product cheaper. Similarly, retrenchment in one segment may be compensated by increased employment in another. Or an overall quickening of the production process may bring down cost of working capital. A more comprehensive picture of costs would emerge only when the new technology package is fully implemented.

17. New Machines, Products, and Techniques: Further Questions

How does the new technology bear on the the most important issue faced by the industry - the shortage of husk and its high price? As already noted, a major factor behind the high price of husk is the skewed distribution of the industry within the industry despite the even distribution of coconut cultivation. The industry is concentrated in southern Kerala where on account of root wilt disease, coconut production is falling significantly. Drawing husk from northern districts involve acting through several intermediaries and carrying husk over long distance and both these tend to hike the delivery price of husk. The introduction of rapid retting in ground level tanks and defibring of green husk in the new mills would have the

effect of rendering the industry footloose making production possible even in those regions where there in no backwater. Thus more activity may be forthcoming in northern districts in the future. This would imply more comprehensive and more economic collection of husk for the State as a whole. At once it could also aggravate the husk shortage already faced by the southern districts.

It would also appear that there is the urgent need to improve upon the 'technologies' for husk collection. Experience so far shows both the state and market have failed in this field. As defibring mills with large capacity being set up, the demand for husk may be expected to rise significantly. Further, with competition raised by new defibring mills the shortage of husk faced by smaller producers may be aggravated and special measures to supply husk to them might become necessary.

Another strategy to counter the shortage and high price of husk is to seek ways of its most economic utilisation. The possibility of producing highly value-added products may be explored.[37] This would help the industry afford the high price of husk. The new technology package does not seem to have considered these aspects seriously.

The proposed defibring mills are of similar design as in Pollachi. Indeed, for long, Pollachi fibre has been used in the fieldwork villages for spinning *Mangadan* yarn. In Pollachi, the fibre is used also for manufacturing ropes. The new technology package aims to produce *Anjuthengu* yarn. Would this fibre suffice the yarn-specifications of weaving? The fibre produced in defibring mills is made from rapid-retted husks, it lacks the saline element that gives extra-strength to the fibre, and is subjected to heavy mechanical beating and combing. Could the yarn produced from this fibre meet the durability needs of mats and mattings? Another problem associated with the new defibring mill is wastage. While wastage is about 10 per cent in the traditional mode, it rises to 15 per cent under the new mode.

Pollachi manufacturers have not gone in for mechanical spinning in a substantive manner. There are only three spinning factories in Pollachi. This is despite Pollachi's technological lead otherwise. XY, the Pollachi entrepreneur with whom we had had extensive conversation, opined that the new spinning technology was neither technologically perfect nor economically efficient. XY, however, seems to miss the fact that the yarn produced is of a new kind and with possibilities for market expansion and rise in prices. He also ignores the social significance of the new technology. Nevertheless, there are certain major drawbacks with the new spinning technology. First, the yarn tends to break too often on the machines tending to affect the output, quality of the yarn, and wages. Second, the machines are not properly designed for a comfortable posture. While each of these have a seat attached to it, most of the workers still stand and spin. Third, the machines were subject to frequent breakdowns, and in the absence of immediate follow-up remained dead for several months. In the fieldwork cooperatives, on an average, only about 50-60 out of 100 spinning machines installed were actually functioning.

The new spinning technology produces a new product. The new *Anjuthengu* yarn replaces the earlier *Mangadan* yarn. The demand for *Mangadan* yarn was from within the country as an end product. This demand has been by and large stagnant. The new yarn would be used

for weaving mats and mattings oriented towards export. With new uses being found, demand for mats and mattings has been highly promising in recent years. It is expected that the local production would be integrated with the 'sun rise' segment of the industry following modernisation. This, however, has a flip side too. *Mangadan* yarn had a niche market. It faced little competition from yarn produced in other localities in the State, as it was a different variety. Would not the destruction of the niche market within the country and its substitution with the unknown mass of the world-market, make it vulnerable to external shocks?

The scale of spinning technology proposed under the new package demands reconsideration. The fieldwork cooperatives, as noted earlier, fall within the category of medium-scale producers. They operate 5-10 *ratt*. The scale of operation is determined primarily by the working capital. Under the new package, each cooperative has installed\would install 100 spinning machines. Full utilisation of capacity would force the cooperatives to go in for additional working capital loans. The fieldwork cooperatives are already in a debt-trap.

New technology can succeed only if it is supported by a manufacture and service infrastructure. The existence of such infrastructure seems to have been taken for granted perhaps owing to the fact that traditional technology had minimal needs on this front. The village carpenters made the *ratt*. Its servicing need was minimal but for occasional oiling to reduce friction. Usually servicing was carried out once a year in the month of *Chingam* when work was temporarily suspended for the *Onam* festival.

At present, defibring mills or its spares are not manufactured in Kerala. These are obtained from Tamil Nadu. Spinning machines and some of its spares are made within the State. There is, however, often a delay in getting the spares. At least, one fieldwork cooperative had to close down for over a week due to such delay. As the spinning machines have not been perfected, breakdowns are frequent. Unlike Pollachi that forms a technological triangle with Coimbatore and Tiruppur, the fieldwork villages lie remote. New cooperatives, dealing in spares and offering technical services, preferably set up by the modernising cooperatives and involving both women workers and technically trained women, seems a possibility worth exploring. Eventually the service cooperatives could aim to enter design and manufacture of the machinery itself and thus help retain the backward linkages of the industry within the State.

There are more fundamental questions as well. First, the new technology requires much financial investment. To what extent such investment is justified? Would not there be less complicated, less expensive methods to attain the goals envisaged by new technology? Perhaps, a comfortable seat and an appropriate work desk for defibring? A moving trolley on rail to replace walking between the spinning wheels? Second, is there any possibility of increasing value-addition without recourse to technological change? Say, by introducing innovative products and founding altogether new market niches? Within the State itself, there is the example set by traditional potter community shifting to the production of terra cotta art objects.

It is imperative to clear the way for a discussion of these and several other important issues

relating to technological change with the full-fledged participation of workers, manufacturers, traders, cooperative, panchayat, and government officials, coir research scientists, and social scientists. Such a discussion could probably form an ideal starting point for a new trajectory of technological change.

18. Concluding Remarks: The Tangle and the Promise of New Technology

Technological backwardness is a crucial fact of Kerala's industrial life. The major industries in the State, coir processing, handloom weaving, and beedi-making are marked by the use of low productive technologies. Further, development of industry in the State, among other factors, thus crucially hinges on technological modernisation. Technological change is, however, not merely a matter of finding new machines for old. It involves several other important social questions. The new techniques could be ideal from the efficiency point of view but it could be inappropriate to the social economy where these are applied. New technology might increase the income of the workers but jeopardise the employment. This study was an attempt to focus on some of these questions by foregrounding the case of coir yarn spinning industry. As these questions could be expected to unfold with many a detail only on micro-examination, the study particularly focused on three villages in southern Kerala, which are important centres of coir yarn production.

Coir industry was chosen for examination because of its social and economic importance. The industry employs vast numbers, the disempowered social sections, mostly of 'lower' and 'out' castes, and an overwhelming majority is women. The wages in the industry are lower than in agriculture and even in the cooperative segment of the industry, statutory minimum wages are not being paid. Owing to competition from new products and new centres of production and other factors, employment in the industry has shrunk to less than six months a year. The ongoing technological change has thus important implications for the marginalised sections of the society. Further, with its ongoing technological change, coir industry could be a 'laboratory model' of sorts. A study of the technological change in coir industry could possibly offer lessons for technological change in Kerala industry in general, and for 'traditional' industries in particular.

The ongoing technological change in the industry addresses some important issues. These include the physical conditions of work, environmental implications of production processes, and possibilities of value-addition. Our study shows that the new technology resolves these issues with varying degrees of success. Technological reorganisation of the retting operation minimises the adverse ecological consequences of the traditional process and also quickens production. The new defibring technology would help eliminate hard labour done in uncomfortable posture in unhygienic conditions. Technological reorganisation of the spinning node would serve to turn out a new variety of yarn, a more value-added product. It also helps the worker to sit and work unlike in the traditional mode where the worker walks and spins. The ongoing technological change appears to have been more successful in improving the physical conditions of work and reducing ecological consequences but less successful in increasing productivity and workers' income.

Between our field visits we could see the new spinning technology 'grow'. Certainly, the

growth was not linear. Some of the initial complaints about the spinning machines were not aired subsequently. This was because the bad machines were discarded and in another case, the entire first batch of machines had to be replaced. The reduced complaint also owes to the fact that as workers gained more experience some of the earlier problems like breaking of yarn became less severe. Indeed, some of the workers learned working on the new machines amazingly fast. The Coir Research Institute offered a month's training for two women workers from each cooperative. These lead workers in turn imparted training to others in their cooperatives. In one of the cooperatives, a lead worker had also become an expert in repairing machines. She had learned this on her own while doing work. In another cooperative, a young man, with some technical training, was doing excellent work in attending the machines. He too had learned by servicing the machines on his own.

Certain negative features mar the project. The possible retrenchment, particularly with its gender and caste dimensions, the elitist and patriarchal manner of introduction of technology, and the inappropriate design of certain machines are some of these. The tragedy of scientists working in isolation from industry is revealed in some of the new techniques such as 'pith plus' that are proposed. There is also an attempt to emulate the so-called 'Pollachi model' without realising that it marks a *different* history of the development of coir industry. Above all, fetishism of technology blinds the search for other, even if less spectacular but more socially advantageous options.

The manner of technological diffusion in the coir industry raises some issues that can not be ignored in our future discussion of issues relating to cooperatives, class consciousness and class power, and status of women in Kerala society. This study demonstrates that though the new technology was introduced in workers' cooperatives, the involvement of workers in decision-making was very little. The fact that the workers are unionised did not make a difference either. Also, the much hyped status of women bears little to the ground reality where despite the fact that coir yarn spinning is almost an all-women industry they are completely excluded from the 'core' of the cooperatives where they work, the trade unions of which they are members. Indeed, it would not be surprising if future enquiries put many more uncomfortable question marks before some of the widely held developmental myths regarding Kerala.

Notes and References

[1] KK Subrahmanian and P. Mohanan Pillai, 'Kerala's Industrial Backwardness: Exploration of Alternative Hypotheses', *Economic and Political Weekly*, Vol.21, #14, 5 April, 1986, pp.577-592. The study shows that average daily wage per worker in the Kerala's factory sector is lower than some of the industrially developed states. As some of the prominent industries in the state work only seasonally, average daily wage per worker was a somewhat inadequate measure, and therefore more pointed measures like average wages per person-day and efficiency wages (ratio of money wages and labour productivity) were employed subsequently. These also showed that with respect to labour Kerala is not a disadvantageous location vis-à-vis other states. See, KK Subrahmanian, 'Development Paradox in Kerala: Analysis of Industrial Stagnation', *Economic and Political Weekly*, Vol. 25, # 37, 15 Sept. 15, 1990, pp.2053-58. The debate is, however, not yet concluded. It has been argued that the inferences drawn regarding the factory sector do not hold good for the small-scale sector, and therefore not adequate to reject the high wage-cost hypothesis for the industrial sector as a whole. See MM Thampy, 'Wage-Cost and Kerala's Industrial Stagnation: Study of Organized Small-Scale Sector', *Ibid*, pp. 2077-2082. For a search-light view of some of these and related issues of Kerala economy, see KP Kannan, 'Kerala Economy at the Crossroads?' *Economic and Political Weekly*, Vol.25, #35-36, September 1-8, 1986, pp. 1951-56.

[2] As Frances Stewart notes: "[T]echnically inefficient techniques may be worth selecting for their distributive consequences, if these distributive consequences are not obtainable in any other way. Thus techniques that are apparently technically inefficient may none the less not always be obsolete." Frances Stewart, *Technology and Underdevelopment* (London and Basingstoke: The Macmillan Press Limited, 1977), p. 14. For an empirical exposition of how introduction of so-called efficient techniques actually led to labour displacement in a country of chronic unemployment see Barbara-Harriss's work on Bangladesh. In particular, Barbara-Harriss, 'Rice Processing Projects in Bangladesh', An Appraisal of a Decade of Proposals', *Bangladesh Journal of Agricultural Economics*, Vol.1, # 2, Dec. 1978, pp. 24-52. In a subsequent study the author unravels the gender dimensions of such displacement. Barbara-Harriss, 'Post Harvest Rice Processing Systems in Rural Bangladesh: Technology, Economics and Employment', *Bangladesh Journal of Agricultural Economics*, Vol. 2, #1, June 1979, pp. 24-50.

[3] According to the coir census of 1988, the industry employed 3.83 lac workers belonging to 2.12 lac coastal households. (Government of Kerala [hereafter, GoK], Department of Economics and Statistics [hereafter, DES], *Report on Coir Workers Census in Kerala, 1988* [hereafter, *Coir Workers Census, 1988*] (Thiruvananthapuram: DES, 1990).

[4] Of 3.83 lakh workers engaged in the industry 3.23 lac workers are women and only 0.6 lac workers men. GoK, State Planning Board [hereafter, SPB], *Economic Review 1998* (Thiruvananthapuram: Government Press, 1998), p. 110. Coir yarn spinning engages 3.55 lac out of the total 3.83 lac workers. (DES, *Coir Workers Census, 1988*). Official statistics do not throw light on the caste composition of workers.

[5] 'Sun set industries' are dying industries. A predominant feature of such industries is the steady exit of capital. In coir not only capital but also labour has been moving away. Such exit of labour is not merely on account of exit of capital and consequent shrinkage of employment opportunities. Change in attitude to work, making the already less preferred work still less preferable, is also an important factor.

[6] James Forbes, *Oriental Memoirs: Selected and Abridged from a Series of Familiar Letters Written during Seventeen Years of Residence in India: Including Observations on Parts of Africa and South America, and a Narrative of Occurrences in Four India Voyages (London: White, Cochrane and Co., 1813*), *Vol.1, pp. 22-23.*

[7] In the Netherlands the people of the village of Genemuiden were involved in the weaving of rush-mats on wooden looms since sixteenth century. By 1870s it had grown into a flourishing industry. Decline, however, set in from the next decade and the activity ceased altogether by 1920. A major reason for this was the closing off of the Zuiderzee (inland sea) which badly affected the rush culture. As a substitute for rush, the Dutch mat industries began using coir yarn or fibre imported from the Kerala coast. For a brief discussion of the historical antecedents of the mat industry in the Netherlands see, TM Thomas Isaac, PA Van Stinjuenberg and KN Nair, *Modernisation and Employment: The Coir Industry in Kerala* [hereafter, *Modernisation and Employment*] (New Delhi: Sage Publication, 1992), Appendix 1, pp 212-231.

[8] For a discussion of the historical aspects of the development of coir processing industry on the Kerala coast see TM Thomas Isaac, *Class Struggles and Industrial Structure: A Study of Coir Weaving Industry in Kerala, 1859-1980* (Thiruvananthapuram: CDS, Doctoral dissertation, 1984); KS Venkataraman, 'Coir Industry and Trade on the Malabar Coast', *Journal of the University of Bombay*, Pt.1, Jan.1940. pp. 52-87, Pt.2, July 1940, pp. 154-83, Pt.3, Jan. 1941, pp. 61-86; KT Rammohan, *Material Processes and Developmentalism: Interpreting Economic Change in Colonial Tiruvitamkur, 1800 to 1945* (Thiruvananthapuram: CDS, Doctoral dissertation, 1996).

[9] Some of the theoretical aspects of commodity chain analysis are discussed in Gary Gereffi and Miguel Korzeniewicz (ed.), *Commodity Chains and Global Capitalism* (Connecticut: Praeger, 1994); Gary Gaereffi, 'Capitalism, Development and Global Commodity Chains' in Leslie Sklair (ed.), *Capitalism and Development* (London and New York: Routledge, 1994), pp. 211-31; Terence K. Hopkins and Immanuel Wallerstein, 'Commodity Chains: Construct and Research', Paper presented at the 16th Political Economy of the World System Conference, Duke University, 16-18 Apr., 1992. Early empirical studies include Eyup Ozveren, 'The Shipbuilding Commodity Chain, 1590-1790', and Sheila Pelizzon, 'The Grain Flour Commodity Chain, 1590-1790', *Ibid*.

[10] The full theoretical import and empirical possibilities of commodity chain are only beginning to be recognised. By advancing commodity chain analysis the world-system approach overcomes at least two of the major criticisms set forth against it. First, the criticism that world system approach ignores production and privileges trade (and is therefore un-Marxist). Second, the criticism that it ignores 'internal' (within the national territory) factors and focuses exclusively on 'external' factors.

[11] This is typical of the state as a whole as well. Of the 2.7 lac members in coir cooperatives only about 75000 are actually working. (GoK, SPB, *Ninth Five Year Plan, 1997-2002, Report of the Task Force on Traditional Industries* [hereafter, *Ninth Plan Task force Report*], (Thiruvananthapuram: 1997), p. 19).

[12] Of the 3.83 lac coir workers in the state, 3.55 lac are employed in the yarn sector. Of these, 0.16 lac are employed in retting, 0.62 lac in defibring, and 2.77 lac in spinning. (DES, *Coir Workers Census, 1988*).

[13] Bindu Nair, ' Women's Health in a Traditional Sector: A Study of Coir Yarn Spinning Industry

in Kerala', *IASSI Quarterly*, April-June 1997, pp. 115-122. The workers seek consultation at the government hospitals but as drugs are rarely available they have to spend a significant part of their wage income on medicines. *Ibid*., p. 121.

[14] Olga Nieuwenhuys, *Angels with Callous Hands: Children's work in rural Kerala (India)* (Amsterdam: Vrija Universiteit, 1990), p.109.

[15] In Kollam district there are 6.7 migrants per 1000 population. Remittances form 19.0 per cent of the net domestic product of the district. BA Prakash, 'Gulf Migration and Its Economic Impact', *Economic and Political Weekly*, Vol. XXXIII, # 50, December 12-18, 1998, pp. 3209-3213.

[16] Statistical profile of fieldwork villages drawn from DES, *Panchayat Level Statistics - Kollam district, 1996* (Thiruvananthapuram: 1997); Thrikkadavur Gramapanchayat, *Thrikkadavur Gramapanchayat Samagravikasanarekha, 1996* (Thrikkadavur Gramapanchayat, n.d); Thrikkaruva Gramapanchayat, *Janakeeyasutranam - Thrikkaruva Gramapanchayat Samagravikasanarekha*, 1996 (Thrikkaruva: Thrikkaruva Gramapanchayat, n.d); Perinadu Gramapanchayat, *Onpatam Padhati Samagravikasanarekha, Perinadu Gramapanchayat* (Perinadu: Perinadu Gramapanchayat, n.d).

[17] Of the 3.83 lac coir workers in the state 3.23 lac are women. In Kollam district of 54621 workers 46251 are women. Caste-wise break-up is not available either for the state or for the district. For a statistical profile of coir workers State-wide see, DES, *Coir Workers Census, 1988*.

[18] Sharat Kumar Bhowmik, 'Ideology and the Co-operative Movement: Worker Co-operatives in the Tea Industry', *Economic and Political Weekly*, Vol.23, #51,17 December 1986, p.2704.

[19] In other centres of coir yarn production also the most impoverished sections of the people are engaged. For instance, as Latif notes, in Bangladesh, "a large number of land less and unemployed and underemployed people...engaged in this industry".(Abdul Latif, *Economics of Coir Industry in Bangladesh: A Case Study* (Dacca: Bangladesh Institute of Development Studies, Case Study #1, Rural Industries Study Project, Nov. 1980, p.11).

[20] Work-discipline procedures in cooperatives are also similar to those employed in privately-owned factories. A conscious move to create a new, socialist work culture was evidenced in Matrika Coir Vyavasaya Sahakarana Sangham set up in Kommadi, Alappuzha. To a good extent the cooperative succeeded in attaining this but owing to corruption the Sangham subsequently went into a decline.

[21] There is room for financial corruption in the purchase of husk and yarn, and sale of products.

[22] The party control of the cooperative is not entirely without benefit. The party officials might sometimes collude with a secretary in his/her corrupt practices but more often it acts as a check against such doings. The party is dependent on the votes of the workers, and sanction of sustained and massive corruption would turn other sections of the local population also against it.

[23] At the beginning of this century, in Ceylon, a new technique of retting by sinking husk in tanks of water warmed by steam was tried. SR Sharma, *Coir Spinning* (n.pl: n.pbr, 1917), p.7. This technique, however, does not appear to have been quite successful. A later work notes that in

Ceylon "husks…are soaked in the same way as…on the West Coast". (SR Sharma(?), *The Economics of Coir Industry (Coir Spinning in Malabar*) (Feroke: S Rajam and Co., 1923).

[24] For a discussion of issues relating to technological change in coir industry see, Isaac, Stinjuenberg and Nair, *Modernisation and Employment*; M Sreenivasan and V Gopalakrishnan Asari, *Technological Change in a Traditional Village Industry: A Case Study of Coir Industry in Kerala* (Thiruvananthapuram: The Centre for Tropical Studies, 1987); TM Thomas Isaac and Pyarelal Raghavan, *A Policy Framework for Revitalisation of Coir Industry in Kerala*, Working Paper # 240, Centre for Development Studies, Thiruvananthapuram.

[25] About 18 workers were required to keep the machine going; its capacity was limited to 4000 husks in eight hours; and the spiked drum was a cause of anxiety – a tiny lapse, and the worker's hand could get sucked into the drum when feeding the husk. Isaac, Stinjuenberg and Nair, *Modernisation and Employment*, p. 159.

[26] For details on the ongoing technological change in coir industry see Coir Board, *A Ten Year Plan for Development of Coir Industry, 1 April 1997 to 31 March 2007* (Kochi: Coir Board, 1996); GoK, SPB, *Report of the Special Task Force on Coir Industry* (Thiruvananthapuram: The State Planning Board, 1990); SPB, *Ninth Plan Task Force Report*; GoK, Directorate of Coir Development, *Kayaruvyavasaya Naveekarana Seminarum Pradarsanavum, 1995, Feb. 17-18, Smaranika* (Thiruvananthapuram: 1995); GoK, *Kayaruvyavasayam Neridunna Pratisandhi Taranam Cheyyunnatinulla Nirdesangal Samarppikkuvan Kerala Government Niyogicha Committeeyude Report, 1997* (Thiruvananthapuram: 1997).

[27] SPB, *Economic Review 1998*, p. 111.

[28] The government task force on traditional industries noted thus: "The environmental consciousness of the people have grown as a threat to the retting operation itself. There are already some areas where retting is not allowed at all." [SPB, *Ninth Plan Task Force Report*, p. 15].

[29] The exact figure of production is not available. Of a total 3.83 lac coir workers in the state 1.54 lac workers are employed in the private sector, SPB, *Economic Review 1998*, p. 110.

[30] SPB, *Economic Review 1998*, p. 41.

[31] Isaac, Stinjuenberg and Nair, *Modernisation and Employment*, p. 56.

[32] There were steady attempts by the state to ensure the supply of husk at a 'fair' price to the coir producers. As early as 1973 the government fixed ceiling prices for green and retted husks; husk dealers and retters were to be licensed and were required to file monthly return of their stock and transactions; movement of husks from between localities was regulated through permits; and, mechanical defibring was banned. The regulations did not work very well, it served only to sabotage the traditional channels of supply, many retters withdrew from business altogether, a black-market developed, production of yarn fell significantly. The regulations were hence relaxed, and in 1980, a new system imposing a levy of 30 per cent of husks handled by each retter was introduced. In 1988 this was substituted with a new three-point levy system involving copra merchants, husk dealers and retters was introduced. The new system has been evaluated as superior to the earlier regulations although procurement through levy still fell short of the requirements of the cooperatives.

For a detailed discussion of state intervention in husk market, see Isaac, Stinjuenberg and Nair, *Modernisation and Employment*, Chapter 5, pp. 119-152.

[33] In 1997-98 the average daily wage rate of "unskilled female worker" in the construction sector was Rs. 87.24 in rural areas and Rs. 89.42 in urban areas. SPB, *Economic Review 1998*, p. 31.

[34] The Minimum Wage Committee, 1953 found that wages had to be raised by a third to ensure a minimum consumption of 2600 calories per adult. Importantly, 40 per cent of the recommended calories were expected to be met from cassava, a cheap carbohydrate substitute for rice. Isaac, Stinjuenberg and Nair, *Modernisation and Employment*, p. 37.

[35] SPB, *Ninth Plan Task Force Report,* p. 112.

[36] XY's is an interesting story. His father was involved in the transport of slaughter cattle from Pollachi to Kerala. The cattle were walked the whole distance and XY's father was a wageworker. Subsequently he settled on the outskirts of Trichur where he set up a dairy. Later he established a coir fibre factory in Pollachi. This was the less advanced type decorticator. Overtime more advanced techniques were brought in and product range diversified. The XY family is now among the richest families in Pollachi. Besides a wide range of coconut and coir products the family is involved in the manufacture of coir machinery, and in the hotel industry.

[37] Suggestions regarding a possible new product range have been made for a long time but the progress have been extremely slow. Many of the ideas that had come up in the 1950s or even earlier are yet to assume materiality. For some of the 1950s ideas see M. Philip Mathew, 'Coir Industry in Trouble', *Economic and Political Weekly*, Vol. 4, # 48, Nov. 29, 1952, pp. 1226-27.